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# GUIDE TO STAND STRUCTURE ANALYSIS FOR THE OLD GROWTH NORTHERN HARDWOOD AND HEMLOCK FOREST



U. S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE



REGION NINE

MILWAUKEE WISCONSIN



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3  
INSTRUCTIONS FOR COMPUTATIONS;  
PHYSICAL AND FINANCIAL  
STAND STRUCTURE ANALYSIS  
FOR THE  
OLD GROWTH NORTHERN HARDWOOD AND HEMLOCK FOREST

2  
U. S. FOREST SERVICE. *North Central Region*  
Region 9  
50 MILWAUKEE, WISCONSIN

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FOREWORD

In the management of northern hardwoods, there is need for an accurate method for economic evaluation of a forest property to serve as a basis for determining the plan of operation and to use as a guide to insure faithful execution of the plan adopted. The purpose of this handbook is to outline in detail a tested method for making a physical and financial stand structure analysis.

The development of a set of tree classes based on value as well as vigor and risk of survival forms the basis for this proposed analysis. These tree classes can be easily recognized in the forest. The stand analysis starts with the inventory of the forest in which trees are tallied by tree class, species, d.b.h., and cut or leave. A stand table constructed from this inventory forms the basis for adjusting values and costs to the new area, determining marginal values, cut and left, and calculating volume and value increment on the stand left.

The extent to which computations are carried in any case will depend on the objective. Where the aim is to evaluate the economic results of a proposed type of cutting to aid in determining whether it is a desirable type, a complete appraisal of the marginal value of the timber cut and left and of the earning power of the residual stand is necessary. Where the objective is merely to determine the value of a stand of timber, the appraisal need consider only total stand and not stand cut and left. Where selective cutting is the accepted practice and the purpose of analysis is to determine the volume and class of tree which should be cut, as a guide to setting up the marking rules, it is only necessary to complete the first step in the computations outlined.

In brief, there is presented in this handbook a complete method of physical and financial analysis which recognizes that all trees of the same species and size do not have the same value or growth potential. The extent to which this detail is used must be determined for each case in the light of the purpose of the analysis.





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PART I

FIELD INSTRUCTIONS



## FIELD PROCEDURE

### Essentials of the Stand Structure Analysis Survey

The procedure for field sampling of the forest as a basis for physical and financial stand structure analysis is similar to the ordinary line-plot timber survey with two important exceptions. First, the trees must be classified and the tree class recorded in each case. Second, the decision must be made as to whether a tree is to be cut or left and the tally segregated according to these decisions.

This second exception necessitates a pre-sampling determination of the class of trees which should be cut in order of priority and the intensity of the cut. These marking rules to guide the cut and leave decisions during sampling may be revised for the actual marking job in light of the analysis.

The intensity of sampling necessary for a standard analysis should be determined in the same manner as for any timber survey.

A field tally sheet which has proved satisfactory is shown on page 5. A field tally Summary sheet is shown on page 5, Part II.

### Salient points in tree class estimate technique

#### Use of the plot tape.

A circular plot is conveniently described by using a "plot tape" the length of the radius of the desired circle. This may be made from a worn out chain or 2-chain tape. One end is fastened to an object at the plot center. The tape is easily pulled out to check every tree along the circumference of the plot where any doubt may exist as to whether or not the tree is in or out. When making measurements, the plot tape must always be straight from the center of the plot to the doubtful tree. If the tree is half in at the butt, it is counted in; otherwise, it is thrown out of count.

#### Accuracy in measurements.

Accurate measurements are important in any system of sampling. Accordingly guesses are not good enough when a measurement can be made. Diameters should all be measured with a diameter tape except when there exists no doubt of the two-inch class into which the tree falls. When in determining the quality class of the tree any doubt exists in the lengths of clear cuttings, a tape measure or graduated stick may be used to check the measurements.



### Methodical coverage of plots.

Plots should be covered methodically to promote efficiency. A method which has proven very practical is to work the plot clockwise or counter clockwise in "pie segments" defined by the plot tape. The estimator begins work as he reaches the end of the plot tape. Trees on a small segment are measured as he approaches the center of the plot. Then, hooking the plot tape through his left arm, he heads for the outside of the plot taking trees between the plot tape and the last segment as he goes. In this manner, when he reaches the plot circumference he has taken all the trees inside of his tape and he has the tape with him to check the edge trees. This process is repeated, taking narrow segments, all around the plot to the starting line which is the 2-chain line measuring tape being used in plot location.

### Speed vs. thorough examination.

It is extremely important that each tree be thoroughly examined. The estimator must be familiar with the tree grade rules, and the surface indications of knots or defects in each species. A good share of the speed and accuracy with which he works depends upon thorough knowledge of what is being looked for. A man with a trained eye can make a quick decision as to the tree grade after a rapid but thorough examination of the tree.

As he sizes up the crown of the tree he is estimating, it is helpful for the estimator to observe also the crowns of the next few trees to be classified. This may save some of the special trips back and forth to look over doubtful, hard-to-see-into crowns. The recorder being free to move about the plot can often help the estimator by reporting the condition of the crown as seen from his point of view.

### Sizes to tally.

For an appraisal of the present merchantable stand and proposed cutting practice, trees from eleven inches dbh and up are tallied. Merchantable cut and leave, near merchantable and cull classes are recognized and tallied separately. When growth is to be estimated for a ten-year period, trees nine inches dbh and up should be tallied. For a twenty-year growth period, it is necessary for most species to tally all trees seven inches dbh and up.

### Map and control.

Unless a map is to be made along with the volume and quality estimate, elaborate control lines need not be run.

### Random plots.

It is sometimes necessary to take additional random (or mechanically chosen) plots to fill out when types are patchy and an insufficient number of plots fall in the type being sampled. This in no wise affects the accuracy of the result.



## Timber condition.

The timber condition of each species is recorded as excellent, good, fair or poor. (page 11). Since timber condition is quite often variable, especially when cruising scattered properties, it is generally good policy to estimate and list the timber condition after completing each ten plots. When the cruise is finished the average timber condition for the species can be determined. For each species the condition class volume table decided upon must be applied to both the stand cut and the stand left.

## Businessman's Method of Selective Cutting

A method of selective cutting which, in most cases, is practical from both the operator's and land owner's points of view has been designated "Businessman's Selection." The essential elements of the method are these: (1) trees of high value and high risk make up the greater part of the cut, (2) fast growing trees are left in the stand to reap high volume and value increases and (3) trees which cannot be logged at a profit are left standing.

Thirty to forty-five percent of the net log scale volume is cut. Much of this volume is in large 1C trees which represent top values, slow rates of growth and high risks. Whenever possible, due regard is given to spacing. An occasional 1A tree is taken where its removal will aid in opening up an over-dense stand. Conversely, an occasional 1C tree is left if its removal would cause too large an opening in a lightly stocked stand.

Under clear cutting, many small trees and trees of poor quality are removed. Most of these are taken at a loss. Under a diameter limit cut, a considerable number of trees not worth handling are taken. In the businessman's selective cut, regardless of the desirability of their removal from a purely non-profit silvicultural angle, these trees are not cut. Left standing, they will help keep the stand windfirm and either will grow to larger size and better quality or will finally be eliminated from the stand by natural forces at no loss to an operator or land owner.

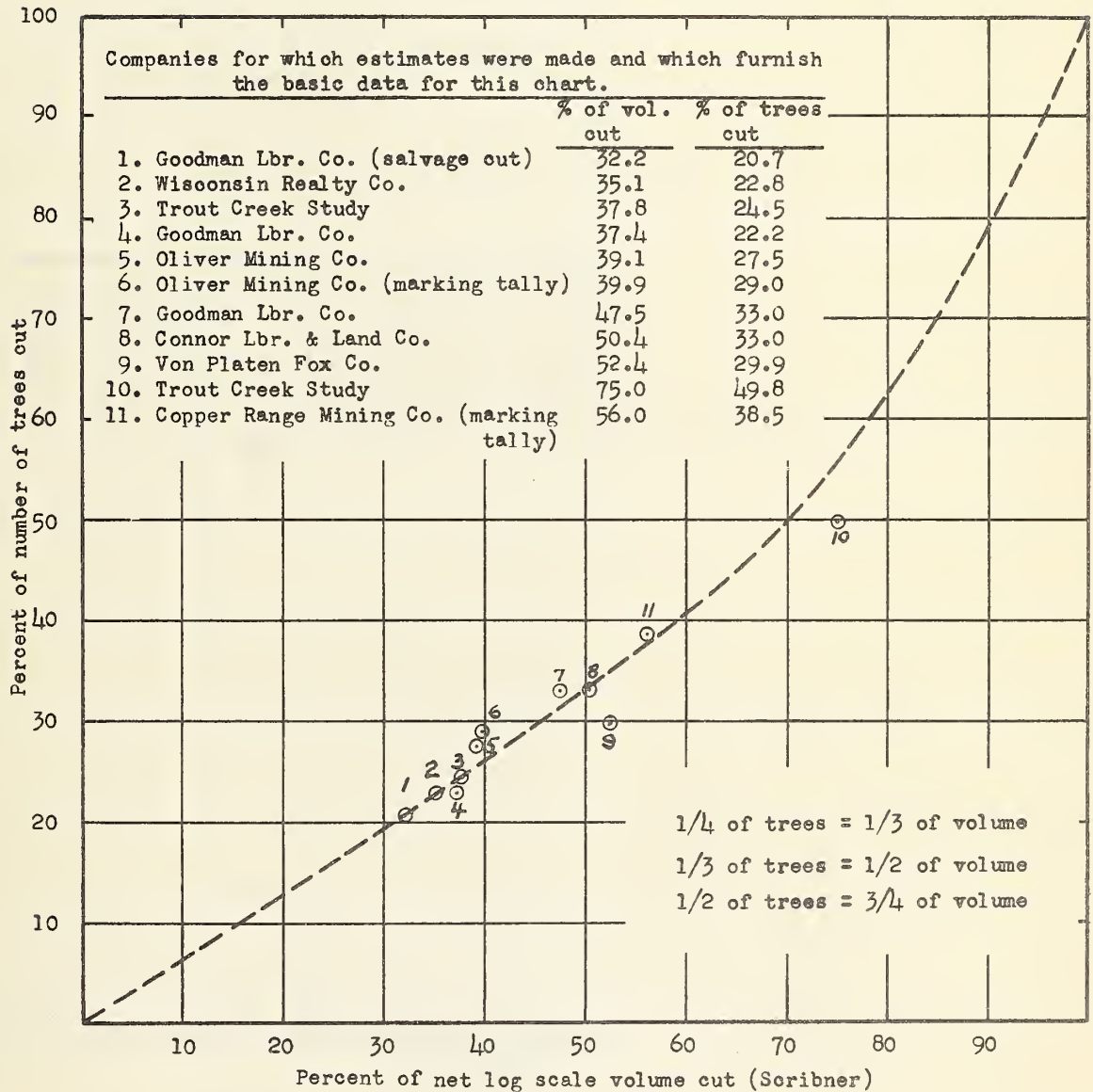
Because non-profit and loss trees are not taken, marginal values are higher under the businessman's selection than under clear or diameter limit cutting. Stands which would handle at a loss on a clear cutting or diameter limit basis can be handled profitably under the tree class system and the businessman's method of selective cutting.



A ROUGH and RAPID CHECK FOR TIMBER MARKERS  
on the  
Percentage of Bd. Ft. volume out

Business Man's Selection

(Cull trees less than 40% sound and 12, 14, and 16 inch trees containing less than 1 standard RR tie not included in these data)



THE HISTORY OF THE  
CITY OF BOSTON  
FROM 1630 TO 1830

BY SAMUEL JOHNSON



NORTHERN HARDWOOD

TREE CLASS TALLY SHEET

PROJECT \_\_\_\_\_ ESTIMATOR \_\_\_\_\_ COMPASSMAN \_\_\_\_\_

CUT DATE \_\_\_\_\_ STRIP \_\_\_\_\_ PLOT \_\_\_\_\_ TYPE \_\_\_\_\_

[illegible]

LEAVE T\_\_\_\_\_ R\_\_\_\_\_ S\_\_\_\_\_ 40\_\_\_\_\_

[illegible]





HARDWOOD LOG GRADES

by

U. S. Forest Products Laboratory

No. 1 Log

Lengths 10 feet or longer, butt logs 12 inches or larger; logs other than butts 15 inches or larger.

Logs under 16 inches in diameter must have not less than  $\frac{5}{6}$  of each of 3 faces clear in not more than 2 cuttings not less than 7 feet long, and in logs 16 inches and over not more than 2 cuttings not less than 5 feet long.

Sweep limited to 15 percent deduction in gross scale.

No logs admitted with a net scale less than 60 percent of gross scale.

No. 2 Log

Lengths 8 feet or longer; diameters 10 inches or larger; logs under 10 feet long must be 12 inches or larger.

Logs 10 feet long, 10 inches or larger, must have not less than  $\frac{2}{3}$  of each of 3 faces clear in not over 2 cuttings 3 feet or longer.

Logs 12 feet or longer will admit not over 3 cuttings per face.

Logs under 10 feet long, 12 inches or over, must cut not less than  $\frac{3}{4}$  clear on 3 faces in not over 2 cuttings 3 feet or longer.

Sweep limited to 30 percent deduction in gross scale.

No logs admitted with net scale less than 50 percent of gross scale.

No. 3 Log

Lengths 8 feet or longer; diameters 8 inches or larger. Logs must scale not less than 40% of their gross volume.

No. 4 Log

Tie cuts. Must have sound centers. No rot. Sweep or crook not more than 4" in 8 feet.

## NORTHERN HARDWOOD TREE GRADES

### Value Groups

1. Trees, the first log of which are grade 1 logs.
2. Trees, the first log of which are grade 2 logs.
3. Trees, the first log of which are grade 3 logs.
4. Trees containing a net of less than 40% of their gross log scale.

### Vigor and Risk Groups

- A. Trees of better than average vigor. Must be free from visible evidence of rot. Small dead branches at base of crown resulting from natural pruning are not considered defects. The position of the crown must be dominant or codominant. The crown is relatively free to grow on the sides. Smaller trees must have sufficient room for development under the canopy. The tree is a very good risk and may safely be left under a partial cutting.
- B. Trees of average vigor. Visible defects are permitted in the first 8 feet of the bole. Defects on the upper bole may consist of large branch stubs and knots. Open rot and serious frost cracks in the tops are not permitted. The top may contain a few fairly large dead branches within the green crown.

The crown may be either dominant, codominant or intermediate. Intermediate trees must have sufficient room for development under the canopy. Crowns in the main canopy may be closed on all sides.

The tree is an average risk or one that has a good chance of survival or withstanding breakage or windthrow following a moderate partial cutting.

- C. Trees of low vigor. The position of the crown may be either dominant, co-dominant or suppressed. The top is usually sparse and contains considerable limb breakage. Many large dead branches may be present. Large lower branches may have broken from the bole. The upper as well as the lower bole may contain large frost cracks. Trees may contain seams below forked tops. There may be evidence of rot in the top or base of the tree. Extensive rot at the base of the tree irrespective of crown condition will place the tree in this class. Trees must be merchantable or those containing a net of 40% of their gross scale.

The tree is a poor risk or one that is likely to deteriorate or be lost following a moderate partial cut.

### D. Culls

Trees containing a net volume of less than 40% of their gross scale.

Tentative Hemlock Tree Grades  
(Also used for white spruce, white pine and northern  
white cedar)

VIGOR AND RISK GROUPS

Tree Vigor A.

Better than average vigor. Crown long, pointed, generally dominant and with a thrifty terminal. May be intermediate if free to grow. Few dead branches except those of moderate size on the lower part of the bole. Upper half of crown free to grow on three or more sides. Foliage heavy and green. Trunk free from visible evidence of rot, straight, well set and not low forked. Bark tight, black and small furrowed. Roots not exposed.

Bole, crown and foliage show no signs of physiological age. The tree is a good risk and may safely be left under partial cutting practices.

Tree Vigor B - Average Vigor

Top of tree beginning to flatten. Terminal weak. Increasing number of dead branches extending into the top of the tree. Moderately large dead limb stubs, and slight limb swells on trunk about the lower crown. Crown dominant to intermediate and generally closed on not more than 3 sides. Smaller trees must have some room for development under the canopy.

Visible evidence of rot occurs in the first eight feet of the bole. Low but tight forks may occur. Some sweep. Bark deeper furrowed with faint red tinge beginning to appear.

Tree of average risk with a good chance of surviving.

Tree Vigor C - Low Vigor

Dominant to suppressed crown generally compressed on three or more sides. Terminal dead or top distinctly flat. Numerous dead branches throughout the crown. Low loose forks, large swollen limb stubs in lower crown. Foliage sparse and often yellowing.

Trunk generally large, often crooked, swollen, visible evidence of rot extending above 8 feet or in the upper bole. Pitch dripping from stubs and black stain about the margins of low cracks. Bark furrows flat topped and with red or yellow tinge. Evidence of borers present. Numerous large stubs in the lower 30 feet of the bole. Many stubs with swollen bases and pitch drippings.

The tree is a very high risk and has many signs of physiological age. Tree must contain 40% of the gross log scale.

Tree Vigor D - Very Low Vigor and High Risk.

Cull trees containing less than 40% of the gross scale in commercial log scale.



WISCONSIN-MICHIGAN HARDWOOD VENEER LOG SPECIFICATIONS  
(As amended by Mr. Girard July 27, 1942  
Subject to further revision)

All veneer logs must be 12" and larger in diameter the small way of the small end. Standard lengths are 10, 12, 14 and 16 feet; occasional 6, 7, and 8-foot logs will be accepted, adding 4" to all lengths for trimming. All logs must be cut from live, green timber, reasonably straight grained, with spiraled grain ordinarily not exceeding one inch in 10 inches.

All logs to be scaled with Scribner Decimal C Log Rule and scaled the small way of the small end, inside the bark.

Logs 12 to 14 inches in diameter can have a 3-inch hole or doze in center, 15 to 16-inch logs can have not to exceed a 5-inch hole or doze in center, and over 16-inch logs, a 6-inch hole or doze in center.

Logs 16 in. and under in diameter must have no seams. Logs over 16" in diameter may have one straight tight seam not diverging more than 4 inches from a straight line from end to end and will not be considered a defect.

10-foot logs must not have over one standard defect; 12-foot logs must not have over two standard defects; 14 and 16-foot logs must not have over three standard defects, but these logs must have at least one-half of their length in one clear cut.

6 and 7-foot logs must be surface clear. 8-foot logs will permit one standard defect if not more than 10" from the end. These short logs, particularly small logs, should be practically straight and in no case should there be more than 2" sweep in 8 feet when measured above the butt swell. The percentage of those short logs that will be acceptable should be agreed upon between the purchaser and the seller. It is evident that if these short logs can be used to advantage in the production of aircraft veneer that they will be accepted.

In scaling defective logs, the purchaser reserves the right to scale off one foot in length for each defect, unless the defects are so located that in cutting out one foot, it eliminated two or more defects. In that event, count the two or more defects as one.

Logs with doze or holes or shake in ends exceeding the amount permitted must be butted to eliminate the defects. Logs with crotch tops are to be cut to eliminate the crotch. Logs with dead or dozy spots or "cat faces" on the surface must be cut to entirely eliminate these defects.

Knots, worm holes, shake, "cat faces", dead and dozy spots, seams, (except as specified herein) and so-called "bird pecks", brown spots, pin-holes and pin-knots shall also be considered defects.

## TIMBER COND. TION

Timber condition is a composite factor affecting the average net volume of trees in old growth stands. A more inclusive term than site index, it considers also physiological age, defect and rot. Timber condition varies by species. More often than not, some species will be excellent or good on the same area where others are fair or poor.

The timber condition of an individual species is determinable by evidences which may readily be observed. Chief among these signs are (1) the height of the mature trees, (2) the number of cull trees per acre, (3) the percent of the number of trees frost cracked and (4) the timber quality and risk as shown by tree classes represented in the estimate.

Ability to judge timber condition is acquired with the help of key guiding standards for these measureable or estimatable quantities. Due to the complex nature of the timber condition factor, standards can not represent rigid pockets into which the species timber condition must fall. The standards are used as guides in balancing the separate factors into the more complex timber condition factor.

Following are key standards based on previous studies and estimates in the old growth hardwood and hemlock stands in the Lake States.

### Key Heights

Dominant trees in the old growth hardwood-hemlock stands (200 years and older) are generally within the total maximum height range which trees of the species are capable of attaining on the site. Key heights represent a mid-point in the maximum height ranges expected in stands of different timber conditions. This is the part that site index plays in the timber condition rating.

#### Total Height of Average Dominant Trees in Feet

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>
Sugar Maple	105	95	85	70
Yellow Birch	90	85	80	75
Basswood	105	100	95	90
Hemlock	115	100	85	65

### Cull Trees

The number of cull trees is an indicator of the physiological age and health of the stand. Although the following table presents the numbers for all species combined, generally these culls will be predominantly of one species.

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>
Average number cull trees per acre	4	8	12	16
Average number cull trees per 1/5 acre plot	1-	2-	2+	3+

### Frost Cracks

Frost cracks due to severe winter weather and other factors at work in the northern hardwood-hemlock region cause losses in net usable volume. In extremely poor timber nearly all trees in the stand may be frost cracked. A table correlated with approximate timber conditions is below:

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>
Percent of trees with frost cracks	10% or less	up to 30%	up to 50%	up to 75%

### Tree Class

The average tree class in the estimate as it revolves about 2B as a center post is an element to be considered. As it goes towards 1A it indicates better timber and conversely, poor timber as it approaches 3C.



PART II

OFFICE COMPUTATIONS



## GENERAL COMPUTING AND CHECKING RULES

### RULES FOR COMPUTING

1. Concentrate on the job at hand. If the mind is wandering the result is needless work for someone else who has to find and correct the errors.
2. Be sure the computer knows what he is doing and why.
3. Take it easy. Do not try to hurry. More time will be lost through errors than can be saved by rushing.
4. Check the work as it is done. Never list without immediately rechecking the work. This should reveal errors made in copying. Where possible check by cross totaling and averaging as each block is finished. Never go ahead until this check has been made.
5. Know the accuracy of the data (not the basis for it) to avoid using it finer than is warranted and to know how close the checks should come to indicate no error in the work.
6. Computing is mostly a one-man job. Two men may be desirable to check copying of long tables or in entering volumes. Most other jobs are better done by one man.
7. Don't try to compute when tired. The computer should take a rest for 10 or 15 minutes or engage in other work. Working when tired often introduces errors that waste more than double the time off for rest.
8. All forms to be used are Region 9 forms and will be referred to henceforth by number only.
9. Do like jobs for all species simultaneously.

Each form in the series includes columns for details not essential to every stand structure analysis, but which may be used for special jobs.

### RULES FOR CHECKING

1. In making all divisions, check the divisor and the dividend listed in the machine immediately before pushing the automatic dividing button.
2. In all multiplications, check the multiplier and the multiplicand listed in the machine immediately before reading the product.
3. Immediately check any copied figure and list the fact that it is checked by placing a dot to the right of the figure copied. Also make sure the figures are recorded on the proper diameter class line and proper tree class column. This line position check is important.

RULES FOR CHECKING (Continued)

4. For all adding and subtracting use a tape adding machine and then check the tape against original figures.

5. In using any kind of machine be sure that the dials are clear before beginning a problem. Press all three clearing buttons on the calculator holding them down for at least one second. To clear the adding machine press the total button. If the deck is not clear, the button will not operate.

## STAND STRUCTURE ANALYSIS STAND TABLE & VOLUME ESTIMATES

### Form 86

DATA - In the field, a cut and leave tally of trees by species and tree classes has been made on fifth acre plots. At the end of each field day, these data have been listed on a progressive cut and leave summary showing the number of trees by species in each tree class and dbh group. This summary has been kept up to date and has been checked as it was made so that as soon as the field work has been completed, there exists a checked summary of the field data ready for immediate use. The timber condition for each species has been indicated on the field summary. Refer to stand table form No. 92, attached. (page 5)

TABLES - Timber Condition - Tree Class volume tables showing different volumes per tree for cut and for leave trees have been prepared and are ready for use. (Table 1)

FORMS - Stand table Forms 86 and 92 are used. One form is used for each species or species group. The form is completed by species or species group only. No summary sheet of all species combined is to be made.

### METHOD:

1. The numbers of trees are listed directly from the field data summary into the corresponding columns and lines of Form 86.

Trees to be cut are listed in the block labeled - Total Stand Cut. Trees that are to be left are entered in the block headed - Total Stand Left. (Check - immediate copy check by lister)

2. The columns, by blocks, are totalled down and across. No entries need be made in the sub-total quality group columns numbered 7, 15 and 23. (Check - cross check of totals)

3. The cut and leave figures of corresponding dbh and tree classes and the totals are added together and listed in their proper columns in the total stand block labeled - Total Stand - at the bottom of the page. (Check - cross check of totals and sum of totals cut and leave)

4. The product of the number of trees in each diameter class in the cut and leave blocks multiplied by the volume listed for the corresponding timber condition, tree class, cut or leave and dbh class is entered in the column to the right of the number of trees. (Check for each entry correct table used, correct volume read from the table, multiplier and multiplicand listed correct on machine at end of machine calculation.)

5. Add columns down and across including sub-totals by quality groups in columns 8, 16 and 24. (Check - cross check of totals)

6. Cut and leave volumes, added together by corresponding dbh and tree classes, are listed in corresponding lines and columns in the total stand block. Quality group sub-total columns 8, 16 and 24 are not added or listed in the total stand. (Check - cross check of totals, sum of totals cut and leave)

THIS COMPLETES WORK ON FORM 86

Attached is Form 86 with all places where no entry is to be made crossed out. Extra spaces on the form are for use when special cases call for especially detailed information not needed in a regular case.



TREES TO BE CUT

SPECIES

Company

### Method of Cut

Area Sampled

No. of Plots

### Timber Condition Volume Table

[illegible]

NEAR MERCHANTABLE TREES			
3A	3B	3C	TOTAL 3A+3B
1	1	1	3
2	2	2	6
3	3	3	9
4	4	4	12
5	5	5	15
6	6	6	18
7	7	7	21
8	8	8	24
9	9	9	27
10	10	10	30
11	11	11	33
12	12	12	36
13	13	13	39
14	14	14	42
15	15	15	45
16	16	16	48
17	17	17	51
18	18	18	54
19	19	19	57
20	20	20	60
21	21	21	63
22	22	22	66
23	23	23	69
24	24	24	72
25	25	25	75
26	26	26	78
27	27	27	81
28	28	28	84
29	29	29	87
30	30	30	90
31	31	31	93
32	32	32	96
33	33	33	99
34	34	34	102
35	35	35	105
36	36	36	108
37	37	37	111
38	38	38	114
39	39	39	117
40	40	40	120
41	41	41	123
42	42	42	126
43	43	43	129
44	44	44	132
45	45	45	135
46	46	46	138
47	47	47	141
48	48	48	144
49	49	49	147
50	50	50	150
51	51	51	153
52	52	52	156
53	53	53	159
54	54	54	162
55	55	55	165
56	56	56	168
57	57	57	171
58	58	58	174
59	59	59	177
60	60	60	180
61	61	61	183
62	62	62	186
63	63	63	189
64	64	64	192
65	65	65	195
66	66	66	198
67	67	67	201
68	68	68	204
69	69	69	207
70	70	70	210
71	71	71	213
72	72	72	216
73	73	73	219
74	74	74	222
75	75	75	225
76	76	76	228
77	77	77	231
78	78	78	234
79	79	79	237
80	80	80	240
81	81	81	243
82	82	82	246
83	83	83	249
84	84	84	252
85	85	85	255
86	86	86	258
87	87	87	261
88	88	88	264
89	89	89	267
90	90	90	270
91	91	91	273
92	92	92	276
93	93	93	279
94	94	94	282
95	95	95	285
96	96	96	288
97	97	97	291
98	98	98	294
99	99	99	297
100	100	100	300

8					
10					
12					
14					
16					
18					

## Instructions

Tally trees by dot & dash system from field tally sheets Form 90 R-9. When all trees are tallied thus, list total number in each block. Subtotal and total all columns down and across as indicated by headings. Cross total check. This sheet forms the basis for all future calculations and must be completed and checked before figures are entered on Form 86 R-9 or Form 91 R-9.

SPECIES

## TREES TO BE LEFT

Timber condition volume table

Method of cut  
Area sampled

dbh	1A	1B	1C	2A	2B	2C	3A	3B	3C	TOTAL A & B	TOTAL C	TOTAL AB & C	TREES LEFT AND NEAR MERCHANTABLE	
													A + B 1	C 2
12														
14														
16														
18														
20														
22														
24														
26														
28														
30														
32														
34														

# STAND STRUCTURE ANALYSIS TOTAL STAND TABLE - NO. OF TREES, NET VOLUME

Company:

Species: *Sugar Maple*

Timber Condition Volume Table Used: *Poor*

Date Completed: *Aug. 31, 1942*

Method of Cut: *Businessman's*

Area Sampled: *43.4 Acres*

Number of Plots: *217*

Selection

Entered by: *Sword*

Checked by: *C.S.*

Worked by: *M.S.*

Checked by: *M.S.*

D	QUALITY 1								QUALITY 2								QUALITY 3								D	GRAND TOTAL			
	Vigor A		Vigor B		Vigor C		Total		Vigor A		Vigor B		Vigor C		Total		Vigor A		Vigor B		Vigor C		Total			B	No. of trees (25)	Net Volume (26)	
	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume	No. of trees	Net Volume							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)					
TOTAL STAND CUT																													
12																										12			
14																										14			
16					2	204		204					4	304		304					2	112		112	16	8	620		
18					1	120		120					2	274	9	981		1255			10	950		950	18	22	2325		
20			1	211	4	704		915					1	178	9	1386		1564			7	798		798	20	22	3277		
22			1	253	2	464		717					1	225	8	1424		1649			6	858		858	22	18	3224		
24			2	584	7	1974		2558					3	813	5	940		1753			1	234	7	1211		1445	24	25	5756
26					3	984		984					3	924	2	364		1288			1	272	4	784		1056	26	13	3328
28					1	345		345					3	468		468					3	621		621	28	7	1834		
30					1	338		338					1	119		119					1	209		209	30	3	666		
32																					1	177		177	32	1	177		
34													1	39		39									34	1	39		
36																									36				
38																									38				
40																									40				
Total			4	1048	21	5133		6181					10	2414	42	6028		8439			2	506	41	5726		6226		120	20846
Per Acre																													
Per Tree																													

TOTAL STAND LEFT																										
12								5	180	8	304				484	7	182	6	180	1	25		387	12	27	871
14			4	452			452	23	1863	20	1500		9	576	3939	5	340	14	868	27	1185		2396	14	102	6787
16	4	532	15	1770	1	112	2414	4	476	23	2461	11	924	3861	2	210	12	1020	16	992		2222	16	88	8497	
18	4	720	7	1106	2	278	2104	1	160	17	2703	5	630	3493			10	1280	16	1760		3040	18	62	8637	
20	3	768	15	4185	2	466	5419	2	448	10	2360	6	1224	4032	1	234	1	189	17	2567		2490	20	57	12441	
22	3	1137	3	1089	1	333	2559	1	304	11	3553	4	1024	4881			2	538	2	414		952	22	27	8392	
24	3	1608	5	2175			3783			3	1212			1212					1	251		251	24	12	5253	
26	1	709	2	1026	1	522	2257			1	490			490					2	626		626	26	7	3373	
28	1	902					902			1	582			582					2	762		762	28	4	2246	
30																								30		
32	1	1150					1150																	32	1	1150
Total	20	7526	51	11803	7	1711	21040	36	3431	94	15165	35	4378	22974	15	966	45	4075	84	6592		13633		387	57647	
or Acre																										
or Tree																										

TOTAL STAND																										
12									5	180	8	304					7	182	6	180	1	25				
14			4	452					23	1863	20	1500		9	576		5	340	14	868	27	1185				
16	4	532	15	1770	3	316			4	476	23	2461	15	1228		2	210	12	1020	18	1104					
18	4	720	7	1106	3	398			1	160	19	2977	14	1611				10	1280	26	2710					
20	3	768	16	4396	6	1170			2	448	11	2538	15	2610		1	234	1	189	24	3365					
22	3	1137	4	1342	3	797			1	304	12	3718	12	2448				2	538	8	1272					
24	3	1608	7	2759	7	1974					6	2025	5	940				1	234	8	1489					
26	1	709	2	1026	4	1506					4	1414	2	365				1	272	6	1410					
28	1	902			1	345					1	582	3	468						5	1383					
30					1	338							1	119						1	209					
32	1	1150																		1	177					
34													1	39												
36																										
38																										
40																										
Total	20	7526	55	12851	28	6844	—	—	36	3431	104	17579	77	10403	—	—	15	966	47	4581	125	14312	—	—	507	78493
Per Acre	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Per Tree	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

d



TIMBER CONDITION - TREE CLASS VOLUME TABLES  
For Stand Cut & Stand Left

Suitable for Businessman's Selective Cuts Removing 40 to 60% of the  
Net Log Scale Board Foot Volume

U. S. Department of Agriculture  
Forest Service                      Region Nine

Milwaukee, Wisconsin

1943



These Scribner net log scale volume tables are built to include the volume above stump to the point where the stem divides into branches or is otherwise non-commercial. The table is not suitable for trees containing less than one 8-foot log or tie with a 10" d.i.b.

These tables exclude cull portions of commercial logs. They are net tables. They refer with approximately equal reliability to the trees to be cut and the trees to be left, where the tally is made by tree classes and where the cut is in the neighborhood of 40 to 60% of the net log scale volume of the stand.

The volume tables are prepared for use on four sites or timber quality classes. Page 11 explains the method of deciding which table to select. From this explanation it is clear that anyone wishing to do so may check these tables by making a gross and net log scale of 50 to 100 trees and measuring their total height and diameter breast high.

The Forest Service will be grateful for information covering cases where the tables have been found in error.

TABLE 1

Sugar Maple  
 (Red Maple)  
 (Black Ash)  
EXCELLENT TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

SUGAR MAPLE (Red Maple) (Black Ash)EXCELLENT TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	80	70	65	60	55	50	60
14	145	140	130	115	110	90	95	90	60	100
16	195	185	170	175	170	125	145	135	95	150
18	250	240	220	240	230	175	215	190	145	200
20	315	310	275	300	285	220	280	245	190	250
22	405	385	345	350	335	265	330	290	230	300
24	520	445	405	390	375	300	370	325	265	350
26	635	505	465	430	415	335	410	360	295	405
28	735	555	515	470	445	365	440	395	325	460
30	820	600	565	500	475	395	470	420	345	510
32	895	645	615	530	500	415	495	445	365	565
34	955	685	655	555	520	435	515	460	380	615
36	1015	725	695	570	530	445	530	475	390	660

SUGAR MAPLE (Red Maple) (Black Ash) \* \* EXCELLENT TIMBER

TABLE 1

Sugar Maple  
(Red Maple)  
(Black Ash)  
GOOD TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

SUGAR MAPLE (Red Maple) (Black Ash)

GOOD TIMBER

Based on 481 trees graded and scaled by tree classes on the  
Trot Creek Study (1940)

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	70	65	60	55	50	45	55
14	130	125	115	105	100	80	85	80	55	90
16	170	165	150	155	150	110	130	120	85	135
18	220	215	195	215	210	155	195	170	130	180
20	285	280	250	270	260	200	250	220	170	225
22	370	350	315	320	305	240	300	265	210	275
24	475	410	370	360	345	275	340	300	240	320
26	580	465	425	395	380	310	375	330	270	370
28	675	510	475	430	410	335	405	360	295	420
30	750	550	520	460	435	360	430	385	315	470
32	815	590	560	485	455	380	450	405	335	515
34	875	625	600	505	470	395	470	420	345	560
36	925	660	635	520	485	410	485	430	355	600

SUGAR MAPLE (Red Maple) (Black Ash) \* \* \* GOOD TIMBER

TABLE 1

Sugar Maple  
(Red Maple)  
(Black Ash)  
FAIR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

SUGAR MAPLE (Red Maple) (Black Ash)

FAIR TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	65	60	55	50	50	40	50
14	115	110	105	95	90	75	75	75	50	80
16	150	140	130	135	130	95	110	105	75	115
18	195	190	170	190	185	135	170	145	115	160
20	255	250	225	240	230	180	225	195	155	200
22	330	315	280	285	275	215	270	235	190	245
24	435	375	340	325	315	250	310	275	220	290
26	525	420	385	360	345	280	340	300	245	335
28	610	465	430	390	370	305	365	325	270	380
30	680	500	470	415	395	325	390	350	290	425
32	735	535	505	435	410	345	410	365	300	465
34	790	565	540	455	425	360	425	380	315	505
36	835	595	575	470	440	370	435	390	320	540

SUGAR MAPLE (Red Maple) (Black Ash) \* \* FAIR TIMBER

TABLE 1

Sugar Maple  
(Red Maple)  
(Black Ash)  
POOR TIMBER

## TIMBER CONDITION - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

SUGAR MAPLE (Red Maple) (Black Ash)

POOR TIMBER

Based on 843 trees scaled on the Alberta Study (1938)

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	60	55	50	45	45	40	45
14	100	100	90	80	80	65	65	65	45	70
16	125	120	110	115	110	85	95	90	65	100
18	170	165	150	165	160	120	150	130	100	135
20	225	220	195	215	205	160	200	175	135	180
22	295	280	250	255	245	195	240	210	170	220
24	390	335	305	295	280	225	275	245	200	260
26	475	380	345	325	310	250	305	270	220	305
28	550	420	385	350	335	275	330	295	245	345
30	610	450	420	375	355	295	350	315	260	380
32	655	475	450	390	365	305	365	325	270	415
34	705	505	485	405	380	320	380	340	280	450
36	745	530	510	420	390	330	390	350	285	485

SUGAR MAPLE (Red Maple) (Black Ash) \* \* \*POOR TIMBER



TABLE 1

Yellow Birch  
EXCELLENT TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

YELLOW BIRCHEXCELLENT TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	80	65	50	55	50	40	60
14	105	85	65	100	85	65	70	65	55	90
16	155	135	115	135	120	95	115	105	95	130
18	215	195	170	185	170	140	170	155	140	180
20	270	250	225	245	220	195	225	205	190	230
22	335	315	290	300	280	250	280	255	240	285
24	400	380	350	355	330	300	330	300	285	340
26	470	445	415	415	385	355	385	350	330	395
28	540	505	475	470	440	405	440	395	375	450
30	615	575	540	535	495	460	500	445	425	505
32	680	640	605	595	550	510	555	490	465	560
34	750	705	670	655	605	560	605	540	510	610
36	820	770	730	715	660	610	660	585	555	655

YELLOW BIRCH \* \* \* \* EXCELLENT TIMBER

TABLE 1

Yellow Birch  
GOOD TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

YELLOW BIRCH

GOOD TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	70	60	45	50	45	40	55
14	90	80	60	85	75	55	65	60	50	80
16	135	120	100	120	105	85	105	95	85	115
18	190	170	150	165	150	125	150	140	125	160
20	240	225	200	215	200	175	200	180	170	205
22	300	285	260	270	250	225	250	225	215	255
24	360	340	315	320	295	270	295	270	255	305
26	425	400	370	370	345	320	345	315	295	355
28	485	455	425	425	395	365	395	355	340	405
30	555	520	490	480	445	415	450	400	385	455
32	615	575	545	535	495	460	500	445	420	505
34	680	640	605	590	545	505	550	490	465	550
36	745	700	665	650	595	555	595	530	505	595

YELLOW BIRCH \* \* \* \* GOOD TIMBER

TABLE 1

Yellow Birch  
FAIR TIMBER

## TIMBER CONDITION - - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

YELLOW BIRCH

FAIR TIMBER

Based on 283 trees graded and scaled by tree classes  
 on the Trout Creek Study (1940)

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	65	55	40	45	40	35	50
14	80	70	50	75	65	50	55	50	45	70
16	115	105	85	100	90	70	90	80	70	100
18	160	145	125	140	125	105	125	115	105	135
20	205	190	170	185	170	145	170	155	145	175
22	260	245	225	235	215	195	215	195	185	220
24	320	300	280	285	265	240	265	240	225	270
26	380	360	335	335	310	285	310	280	265	320
28	440	415	390	385	360	330	360	325	310	370
30	505	470	445	440	405	375	410	365	350	415
32	565	530	500	490	455	420	460	410	385	465
34	625	590	555	545	505	465	505	450	425	505
36	685	645	610	600	550	510	550	490	465	550

YELLOW BIRCH \* \* \* FAIR TIMBER

TABLE 1

Yellow Birch  
POOR TIMBER

## TIMBER CONDITION - - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

YELLOW BIRCH

POOR TIMBER

Based on 158 trees scaled on the Alberta Study (1938)

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	60	50	35	40	40	30	45
14	70	60	45	65	55	40	50	45	35	60
16	95	85	70	80	70	55	70	65	55	80
18	125	115	100	110	100	85	100	95	85	105
20	155	140	130	135	125	110	125	115	105	130
22	190	175	160	170	155	140	155	140	135	160
24	220	210	195	195	180	165	180	165	155	185
26	255	240	225	225	210	190	210	190	180	215
28	290	270	255	250	235	215	235	210	200	240
30	320	300	285	280	260	240	260	235	225	265
32	350	330	305	305	285	260	285	255	240	290
34	380	360	340	330	305	285	310	275	260	310
36	410	385	365	360	330	305	330	295	280	330

YELLOW BIRCH \* \* \* POOR TIMBER

## TABLE

Basswood  
EXCELLENT TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

BASSWOOD

EXCELLENT TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	65	55	40	50	40	35	45
14	115	110	90	110	95	65	60	50	45	95
16	195	185	160	155	135	105	80	70	60	155
18	275	265	240	195	180	145	100	90	80	225
20	365	350	325	240	225	185	125	120	105	300
22	460	440	410	280	265	225	155	145	130	380
24	555	535	495	325	310	265	190	180	165	465
26	650	625	580	370	350	305	225	215	200	560
28	750	720	665	410	395	345	260	250	240	655
30	850	815	750	455	435	385	295	285	275	750
32	950	910	835	495	480	425	330	320	310	845
34	1045	1005	920	540	520	465	365	355	345	945
36	1145	1100	1005	580	560	505	400	390	385	1040

BASSWOOD \* \* \* EXCELLENT TIMBER



TABLE 1

Basswood  
GOOD TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

BASSWOOD

GOOD TIMBER

Based on 97 trees graded and scaled by tree classes  
 on the Trout Creek Study (1940)

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	65	50	30	50	40	35	45
14	110	100	85	100	85	60	55	50	40	90
16	170	160	145	135	120	95	70	60	55	140
18	240	230	210	170	155	125	90	80	70	195
20	315	300	280	205	190	160	110	100	90	255
22	390	375	350	240	225	195	135	125	115	325
24	470	455	420	275	260	225	160	150	140	395
26	550	530	490	310	295	260	190	180	170	470
28	630	610	560	345	330	290	220	210	200	550
30	715	685	630	380	365	325	245	240	230	630
32	795	765	700	415	400	360	275	270	260	710
34	875	840	770	450	435	390	305	300	290	790
36	960	920	840	485	470	425	335	330	320	870

BASSWOOD \* \* \* GOOD TIMBER

TABLE 1

Basswood  
FAIR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

BASSWOOD

FAIR TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	60	50	30	45	40	30	40
14	95	90	75	90	80	55	50	45	35	80
16	150	140	125	115	105	80	60	55	45	120
18	200	195	175	145	130	105	75	65	60	165
20	260	250	230	170	160	130	90	85	75	210
22	320	305	285	195	185	160	110	100	90	265
24	380	365	340	220	210	180	130	120	115	320
26	440	425	395	250	240	210	150	145	135	380
28	505	485	450	275	265	235	175	170	160	440
30	570	550	505	305	295	260	200	190	185	505
32	640	615	560	335	325	285	220	215	210	570
34	705	675	620	365	350	315	245	240	235	635
36	770	740	670	390	380	340	270	265	260	700

BASSWOOD \* \* \* FAIR TIMBER

TABLE 1

Basswood  
POOR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

BASSWOOD

POOR TIMBER

Based on 37 trees scaled on the Alberta Study (1938)

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	60	45	25	40	35	30	40
14	90	80	70	80	70	50	45	40	35	70
16	130	125	110	105	95	70	55	45	40	105
18	175	165	150	120	110	90	65	55	50	140
20	215	205	190	140	130	110	75	70	60	175
22	260	250	230	160	150	130	90	85	75	215
24	310	295	275	180	170	150	105	100	90	260
26	355	340	315	200	190	165	120	115	110	305
28	400	385	355	220	210	185	140	135	125	350
30	445	430	395	240	230	205	155	150	145	395
32	490	470	430	255	245	220	170	165	160	435
34	535	510	470	275	265	240	185	180	175	480
36	575	550	505	290	280	255	200	195	190	520

BASSWOOD \* \* \* POOR TIMBER

TABLE 1

Elm  
EXCELLENT TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

ELM

EXCELLENT TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	40	35	30	20	20	15	40
14	110	100	95	85	75	70	60	50	45	85
16	155	145	140	135	125	115	105	95	80	135
18	210	200	190	190	180	165	160	145	125	190
20	280	270	260	260	245	230	220	200	170	260
22	360	350	335	335	320	300	280	260	220	335
24	455	445	430	425	410	385	350	325	270	425
26	575	565	550	535	515	490	425	400	325	535
28	705	695	675	650	630	600	500	470	380	650
30	820	810	790	760	740	710	550	520	415	760
32	925	915	900	865	840	810	595	565	445	865
34	1020	1015	990	965	940	910	650	615	480	965
36	1110	1105	1080	1060	1035	1000	705	670	520	1060
38	1200	1190	1165	1150	1130	1090	770	730	560	1150
40	1285	1275	1250	1240	1215	1175	835	790	600	1240
42	1370	1360	1335	1325	1300	1260	900	860	645	1325
44	1455	1440	1420	1410	1385	1340	975	930	690	1410

ELM \* \* \* EXCELLENT TIMBER

TABLE 1

Elm  
GOOD TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

ELM

GOOD TIMBER

Based on 157 trees scaled on the Alberta Study (1938)

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	40	35	30	20	15	15	40
14	95	85	80	75	65	60	50	45	40	75
16	130	120	115	115	105	95	90	80	70	115
18	175	170	160	160	150	140	135	120	105	160
20	230	220	210	210	200	185	180	165	140	210
22	290	285	275	270	260	245	230	210	175	270
24	370	360	345	340	330	310	280	265	220	340
26	465	460	445	430	415	395	345	325	265	430
28	590	580	565	545	530	505	420	390	320	545
30	695	690	670	645	630	605	470	440	355	645
32	800	790	775	745	725	700	515	485	385	745
34	885	880	860	835	820	790	565	535	420	835
36	970	965	945	925	905	875	615	585	455	925
38	1050	1045	1025	1010	990	955	675	640	490	1010
40	1135	1125	1105	1095	1070	1040	735	700	530	1095
42	1210	1200	1180	1175	1150	1115	800	760	570	1175
44	1290	1280	1260	1250	1230	1190	865	825	615	1250

ELM \* \* \* GOOD TIMBER



TABLE 1

Elm  
FAIR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

ELM

FAIR TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	40	30	25	20	15	10	40
14	85	75	70	65	60	50	45	40	35	65
16	110	105	100	95	90	80	75	70	60	95
18	150	140	135	135	125	115	110	100	85	135
20	195	185	180	180	170	160	150	140	120	180
22	245	240	230	230	220	205	195	180	150	230
24	310	305	295	290	280	260	240	220	185	290
26	390	380	370	360	350	330	290	270	220	360
28	480	475	460	445	430	410	340	320	260	445
30	565	560	545	525	510	490	380	360	290	525
32	645	640	625	600	590	565	415	395	310	600
34	720	710	695	675	660	640	455	430	340	675
36	785	780	765	750	735	710	500	475	370	750
38	850	845	830	820	800	775	545	520	400	820
40	915	910	895	885	865	840	595	565	430	885
42	980	975	955	950	930	905	645	615	465	950
44	1045	1035	1020	1015	995	960	700	670	495	1015

TABLE 1

Elm  
POOR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

ELM

POOR TIMBER

DBH	Tree Class			Tree Class			Tree Class			All tree classes combined
	1A	1B	1C	2A	2B	2C	3A	3B	3C	
12	--	--	--	35	30	25	20	15	10	35
14	75	65	60	55	50	45	40	35	30	55
16	95	90	85	80	75	70	65	60	50	80
18	125	115	110	110	105	95	95	85	70	110
20	160	155	145	145	140	130	125	115	95	145
22	200	195	190	190	180	170	160	145	125	190
24	255	250	240	235	225	215	195	180	150	235
26	315	305	300	290	280	265	230	215	180	290
28	380	375	365	350	340	325	270	250	205	350
30	440	435	420	405	395	380	295	275	220	405
32	490	485	475	460	445	430	315	300	235	460
34	535	530	520	505	495	475	340	325	255	505
36	580	575	560	550	540	520	365	350	270	550
38	615	610	600	590	580	560	395	375	285	590
40	655	650	635	630	615	600	425	405	305	630
42	685	680	670	665	655	635	455	430	325	665
44	720	715	705	700	685	665	485	460	345	700

ELM \* \* \* POOR TIMBER

TABLE 1

Hemlock (Northern White Cedar)  
EXCELLENT TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

HEMLOCK (Northern White Cedar)

EXCELLENT TIMBER

DBH	Tree Class			All tree classes combined
	A	B	C	
12	60	50	45	50
14	100	90	75	90
16	155	140	115	135
18	215	205	160	190
20	295	280	215	250
22	395	380	275	320
24	520	500	350	390
26	670	650	425	470
28	800	775	505	550
30	915	895	600	635
32	1020	995	695	720
34	1120	1095	805	805
36	1215	1190	880	880
38	1320	1285	965	950
40	1420	1385	1010	1010
42	1540	1500	1070	1070
44	1670	1625	1120	1120

HEMLOCK (Northern White Cedar)

EXCELLENT TIMBER

TABLE 1

Hemlock (Northern White Cedar)

GOOD TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

HEMLOCK (Northern White Cedar)

GOOD TIMBER

DBH	Tree Class			All tree classes combined
	A	B	C	
12	55	45	40	45
14	90	80	65	80
16	135	125	100	120
18	190	180	140	170
20	260	250	190	220
22	345	335	245	280
24	450	435	300	340
26	575	555	365	400
28	670	655	425	465
30	760	740	495	530
32	835	815	570	590
34	905	885	650	650
36	980	955	705	705
38	1060	1030	775	760
40	1140	1115	810	810
42	1235	1205	855	855
44	1340	1305	900	900

HEMLOCK (Northern White Cedar) \* \* \* \* GOOD TIMBER

TABLE 1

Hemlock (Northern White Cedar)  
FAIR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

HEMLOCK (Northern White Cedar)

FAIR TIMBER

Based on 259 trees graded and scaled by tree classes  
 on the Trout Creek Study (1940)

DBH	Tree Class			All tree classes combined
	A	B	C	
12	45	40	35	40
14	75	70	55	65
16	115	105	85	100
18	165	155	120	145
20	225	215	165	190
22	300	290	210	240
24	390	375	260	295
26	495	480	315	350
28	580	565	370	400
30	650	635	425	455
32	705	690	480	500
34	750	730	535	535
36	785	765	565	565
38	815	795	595	585
40	840	820	600	600
42	865	840	600	600
44	880	855	590	590

HEMLOCK (Northern White Cedar) \* \* FAIR TIMBER



TABLE 1

Hemlock (Northern White Cedar)  
POOR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

HEMLOCK (Northern White Cedar)

POOR TIMBER

Based on 78 trees scaled on the Alberta Study (1938)

DBH	Tree Class			All tree classes combined
	A	B	C	
12	35	30	25	30
14	60	55	45	50
16	85	80	65	75
18	115	110	85	100
20	150	140	110	125
22	190	185	135	155
24	240	235	160	180
26	300	295	190	210
28	350	340	225	245
30	395	385	260	275
32	435	425	300	310
34	475	465	340	340
36	505	495	365	365
38	530	520	390	380
40	545	535	390	390
42	550	540	385	385
44	545	530	365	365

HEMLOCK (Northern White Cedar) \* \* \* \* POOR TIMBER

TABLE 1

White Pine and White Spruce  
EXCELLENT TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per tree in Board Feet

WHITE PINE AND WHITE SPRUCE

EXCELLENT TIMBER

DBH	Tree Class			All tree classes combined
	A	B	C	
12	80	60	45	60
14	115	90	65	90
16	205	155	115	155
18	310	245	185	245
20	435	350	260	350
22	565	465	355	465
24	705	585	455	585
26	840	710	565	710
28	975	835	680	835
30	1105	955	795	955
32	1230	1070	905	1070
34	1350	1180	1010	1180
36	1470	1285	1110	1285
38	1590	1385	1210	1385
40	1710	1480	1300	1480
42	1825	1565	1385	1565
44	1935	1635	1450	1635

WHITE PINE AND WHITE SPRUCE \* \* \* EXCELLENT TIMBER

TABLE 1

White Pine and White Spruce  
GOOD TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

WHITE PINE AND WHITE SPRUCE

GOOD TIMBER

DBH	Tree Class			All tree classes combined
	A	B	C	
12	70	55	40	55
14	105	85	60	85
16	185	140	105	140
18	270	215	160	215
20	375	300	225	300
22	480	395	300	395
24	595	495	385	495
26	700	595	475	595
28	810	695	565	695
30	915	790	655	790
32	1015	885	745	885
34	1115	975	835	975
36	1210	1060	915	1060
38	1305	1140	995	1140
40	1400	1215	1065	1215
42	1495	1280	1135	1280
44	1580	1335	1185	1335

WHITE PINE AND WHITE SPRUCE \* \*

GOOD TIMBER

TABLE 1

White Pine and White Spruce  
FAIR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

WHITE PINE AND WHITE SPRUCE

FAIR TIMBER

DBH	Tree Classes			All tree classes combined
	A	B	C	
12	65	50	40	50
14	95	75	55	75
16	165	125	95	125
18	240	190	140	190
20	320	255	195	255
22	405	330	250	330
24	485	405	315	405
26	565	480	380	480
28	645	550	450	550
30	720	625	520	625
32	795	695	585	695
34	870	760	650	760
36	945	825	715	825
38	1015	885	775	885
40	1090	945	830	945
42	1160	995	880	995
44	1225	1040	920	1040

WHITE PINE AND WHITE SPRUCE \* \* FAIR TIMBER

TABLE 1

White Pine and White Spruce  
POOR TIMBER

## TIMBER CONDITION - - TREE CLASS VOLUME TABLE

For Stand to be Cut and Left

Scribner Net Log Scale Volume per Tree in Board Feet

WHITE PINE AND WHITE SPRUCE

POOR TIMBER

DBH	Tree Class			All tree classes combined
	A	B	C	
12	60	45	35	45
14	85	70	50	70
16	145	110	80	110
18	200	155	115	155
20	260	210	160	210
22	320	260	200	260
24	375	315	245	315
26	430	365	290	365
28	480	410	335	410
30	530	460	380	460
32	585	505	430	505
34	630	550	475	550
36	680	595	515	595
38	730	635	555	635
40	780	675	595	675
42	830	710	630	710
44	875	740	655	740

WHITE PINE AND WHITE SPRUCE \* \* POOR TIMBER



Table 1A

HEMLOCK BARK TABLES

<u>Tree Diameter Breast-high</u>	<u>Volume of Hemlock Bark in Stacked cords- Vermont (1) Cords per tree</u>	<u>Cords of Bark per MBM (Doyle-Scribner) for Hemlock Trees in the Southern Appalachians (2) Cords per MBM</u>
8	.03	-
10	.06	-
12	.08	2.8
14	.10	1.9
16	.14	1.3
18	.18	1.1
20	.22	.9
22	.28	.8
24	.34	.7
26	.40	.6
28	.46	.5
30	.55	.4

- (1) Excerpt from "Hemlock in Vermont," by A. F. Hawes, State Forester; Vermont Agricultural Experiment Station Bulletin 161 (January 1912). This table was constructed by "subtracting the volumes of the trees inside the bark from their volumes outside the bark, and multiplying by 0.4, on the assumption that 40 per cent of an average stacked cord of bark is solid bark." The accuracy of this factor (taken from Schenck's "Forest Mensuration," 1905, p. 14) was borne out by investigations of a few piles of bark.
- (2) Excerpt from Bulletin 152, U. S. Department of Agriculture, Table 18. From data secured under the direction of Walter Mulford, 1905-6.



TENTATIVE TABLE FOR CONVERTING YELLOW BIRCH TREE GRADES TO VENEER BOLTSGross and Net Log Scale (Scribner)Good Quality Yellow Birch TimberQ u a l i t y N o. 1. T r e e

DBH of tree	Lineal feet of veneer in tree	Rough diam. of core* Inches	Gross log scale including core Bd. Ft.	Net log scale excluding core Bd. Ft.	Net log scale of entire tree in veneer Percent	Percent of 54", 76" and 88" veneer Percent
12	-	-	-	-	-	-
14	10	5	40	22	24	40
16	14	5	80	55	42	39
18	16	6	132	100	51	37
20	17	6	186	148	56	35
22	18	6	245	199	60	34
24	18	7	308	254	65	31
26	19	7	370	306	70	28
28	19	8	432	358	74	24
30	19	8	495	406	78	20
32	20	9	555	447	82	15
34	20	10	612	478	86	8
36	20	12	666	493	90	2
Weighted Average				150	58	

Q u a l i t y N o. 2 T r e e

12	-	-	-	-	-	-
14	5	5	20	12	17	84
16	6	5	45	33	23	78
18	8	6	75	58	35	73
20	8	6	100	78	41	69
22	10	7	140	112	47	64
24	10	7	185	151	52	60
26	11	8	240	198	57	56
28	12	8	305	253	61	53
30	12	9	365	299	65	50
32	12	10	430	344	69	46
34	13	12	490	380	73	43
36	13	13	540	400	77	40
Weighted Average				70	39	

\*Assumed covers approximate core and cull deductions.

(over)

Table 1C

<u>Q u a l i t y   N o .   3   T r e e</u>						
<u>DBH of tree</u>	<u>Lineal feet of veneer in tree</u>	<u>Rough diam. of core* Inches</u>	<u>Gross log scale including core Bd. Ft.</u>	<u>Net log scale excluding core Bd. Ft.</u>	<u>Net log scale of entire tree in veneer Percent</u>	<u>Percent of 54", 76" and 83" veneer Percent</u>
12	-	-	-	-	-	-
14	1	6	5	3	5	100
16	1	6	10	7	8	100
18	2	7	20	16	11	100
20	2	7	30	24	13	100
22	3	7	50	40	15	-
24	5	8	65	48	16	-
26	6	8	80	54	17	-
28	7	9	105	68	18	-
30	8	10	125	72	18	-
32	9	12	150	76	18	-
34	10	13	170	70	18	-
36	11	14	195	67	18	-
<u>Weighted Average</u>				24	14	

\*Assumed covers approximate core and cull deductions.

Based on 263 trees graded for both veneer and tree grades while still standing in the woods. Good quality yellow birch timber. Gross net log scale (cribmer) based on scaling the small way of the small end of the log. Taper tables used to determine scale. The core diameter is the basis for the cull deduction as well as the deduction in net log scale for the core itself. This table should be used with careful judgment since it is not based on actual measurements on a logging job.

# STAND STRUCTURE ANALYSIS--MARGINAL VALUE CALCULATIONS-STEP I

## Form 87

DATA - Data for the marginal value calculations are obtained from completed forms 86 and from forms 88 and 89. These last two forms are to be worked as soon as the Total Volume Table section has been completed on the individual species and the summary for all species combined on forms 87. This intermission in the work of Form 87 is indicated below.

FORMS - Form 87 - MARGINAL VALUE CALCULATIONS - will be used for these calculations. One form is required for each species. The summary of all species combined is also made on this form.

TABLES - Net Log Scale Overrun Tables are attached for use. For most cases use "Percent overrun with ties not converted to 3a lumber." (Table 2)

### METHOD:

#### STEP I - TOTAL VOLUME TABLE SECTION

##### a. Individual species forms 87

1. In columns 1 and 2 on form 87 list the total number of trees and the total net log scale volume by dbh classes for cut, leave and total stand from columns 25 and 26 on form 86. (Check - copy check by lister and line and column position check)

2. In column 4 opposite net log scale volumes listed in column 2 enter the overrun corresponding to that dbh from the net log scale overrun tables for the species (Table 2, Page 49). Use ties not converted in most cases. (Check - correct species, copy check by lister and line and column position check)

3. For each dbh class in the cut and leave blocks calculate the lumber tally volume by multiplying the net log scale volume in column 2 by 100 percent plus the overrun percent in column 4. Enter the lumber tally volume in column 5. (Check - machine multiplying check)

4. Total down lumber volumes columns in cut and leave blocks. (Check-adding machine tape)

5. Calculate the log scale and lumber tally volumes per acre and the number of trees per acre by dividing the Cut and Leave Block totals of columns 1, 2 and 5 by the number of acres in the area sampled. (Check - machine division check)

6. Add together the cut and leave lumber tally volumes in each diameter class and list the sum on the corresponding dbh lines in corresponding columns of the Total Stand block. This includes total and per-acre values. (Check - Cut and Leave Totals added together equal Total Stand Totals.)



7. Compute the average overrun for the Cut, Leave and Total Stand blocks by dividing the total lumber tally volumes (totals column 5) by the net log scale total volumes (totals column 2) and subtracting 100%. List these figures on the block average lines in column 4. (Check - machine division check)

THIS COMPLETES THE TOTAL VOLUME TABLE SECTION FOR INDIVIDUAL SPECIES

b. Summary form 87

1. To summarize the individual species forms 87 just completed, add together by dbh classes in the Cut and Leave blocks the numbers of trees (column 1), the net log scale volumes (column 2) and the lumber tally volumes (column 5) and list the totals on the corresponding lines in the corresponding columns on the summary form 87.

2. Total columns down. (Check - cross total with sum of totals on individual species forms 87, Cut and Leave totals added together equal Total Stand totals. Make line and column position check for each species.)

3. Calculate per acre volumes at the bottoms of each column by dividing the totals by the number of acres in the area sampled. (Check - machine dividing check)

(a) By dbh classes, totals and per acre, add together corresponding cut and leave values separately for columns 1, 2 and 5 and list in corresponding columns and on corresponding lines in the Total Stand block. (Check - adding machine tape)

4. Calculate the average overruns for each diameter class and the block average for the stand cut, stand left and the total stand by dividing the lumber tally volume (column 5) by the corresponding net log scale volume (column 2) and subtracting 100 percent. List on the corresponding dbh or block average line in column 4. (Check - machine dividing check)

THIS COMPLETES THE TOTAL VOLUME TABLE SECTION FOR ALL SPECIES COMBINED.

INTERMISSION TO COMPLETE FORM 88 - Lumber Value Adjustments to New Stand Tables and New Prices - and FORM 89 - Adjustments to New Stand Tables and Company Costs.

STAND STRUCTURE ANALYSIS

Company:   
Species: *Sugar Maple*   
Costs-Original: *Current Average* Volume Table Used: *Poor*   
Date: *Sept. 1, 1942*

MARGINAL VALUE   
CALCULATIONS   
Method of Cut: *Businessman's*   
Area Sampled: *42.4 Acres*   
Lumber Values-Original: *Tentative Ceiling* Number of Plots: *217*   
Date: *July 4, 1942*

Selection   
Entered by: *M.S.*   
Checked by: *M.S. & W.B.*   
Worked by: *M.S.*   
Checked by: *M.S.*   
Date Completed: *Sept. 3, 1942*

D  B  H	TOTAL VOLUME TABLE						COST PER M.B.M.						VALUE PER M.B.M.		MARGINAL VALUES						(20)	(21)	(22)	(23)	(24)	(25)	
	No. of trees	Net Log Scale		Mill over run	Lumber Tally		Net Log Scale			Lumber Tally			Net Log Scale	Lumber Tally	per M.B.M.		TOTAL	Per Tree	Per Acre								
		Total	%		Total	%	Log-ging	Mill-ing	Total	Log-ging	Mill-ing	Total			Net Log Scale	Lumber Tally				Net Log Scale							Lumber Tally
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)									
TOTAL STAND CUT																											
12																											
14																											
16	8	620		24.5	772							28.13	38.72	10.57	8.18	1.02	.19										
18	22	2325		21.0	2813							27.15	38.54	11.39	32.04	1.46	.74										
20	22	3277		18.0	3867							26.43	43.39	16.98	65.35	2.97	1.51										
22	18	3824		15.0	3708							25.14	45.11	19.27	71.45	3.97	1.65										
24	25	5756		11.5	6418							25.61	49.03	23.41	150.25	6.01	3.46										
26	13	9328		8.5	3611							25.32	49.88	24.56	88.49	6.82	2.04										
28	7	1424		5.5	1513							24.18	50.65	25.47	38.54	6.51	.89										
30	3	666		2.5	683							25.00	58.25	33.25	22.71	7.57	.52										
32	1	177		-0.5	176							24.86	65.17	20.33	3.58	3.58	.08										
34	1	39		-3.0	38							24.85	57.70	32.85	1.25	1.25	.03										
36																											
38																											
40																											

TOTAL STAND LEFT																									
12	27	871		36.0	1185							30.35	30.60	.25	.30	.01	.01								
14	102	6787		28.5	8721							28.26	33.70	4.44	38.72	.38	.89								
16	88	8497		24.5	10579							28.13	38.12	9.99	105.68	1.20	2.44								
18	62	7637		21.0	10451							27.15	40.44	12.89	134.71	2.17	3.10								
20	57	12441		18.0	14680							26.43	46.27	17.84	261.89	4.59	6.03								
22	27	1392		15.0	9651							25.14	46.86	21.02	202.86	7.51	4.67								
24	12	5253		11.5	5357							25.61	52.74	27.13	158.90	13.24	3.66								
26	7	3273		8.5	3660							25.32	50.36	29.04	106.29	15.18	2.45								
28	4	2246		5.5	2370							25.18	53.38	28.20	66.83	16.71	1.54								
30																									
32	1	1150		-0.5	1144							24.84	73.89	49.05	56.11	56.11	1.29								
Total	387	57647	100.0		68298	100.0											1132.29		26.08						
Average				18.4																					
Per Acre	8.9	1328			1573								26.95	43.53	16.58		2.93		26.08						

TOTAL STAND																									
12	27	871		36.0	1185							30.35	30.60	.25	.30	.01	.01								
14	102	6787		28.5	8721							28.26	33.70	4.44	38.72	.38	.89								
16	96	9117		24.5	11351							28.13	38.16	10.03	113.86	1.19	2.63								
18	84	10962		21.0	13264							27.15	39.71	12.56	116.75	1.39	3.84								
20	79	15718		18.0	18547							26.43	44.87	17.64	327.24	4.14	7.54								
22	45	11616		15.0	13359							25.14	46.37	20.53	274.31	6.10	6.32								
24	37	11009		11.5	12275							25.61	50.80	25.19	309.15	8.36	7.12								
26	20	6701		8.5	7271							25.32	52.14	26.82	194.98	9.75	4.49								
28	11	3680		5.5	3883							25.18	52.32	27.14	105.37	9.51	2.43								
30	3	666		2.5	683							25.00	58.24	33.24	82.71	7.57	.52								
32	2	1327		-0.5	1320							24.84	70.06	45.22	59.69	29.85	1.37								
34	1	39		-3.0	38							24.85	57.63	32.78	1.28	1.25	.03								
36																									
38																									
40																									
Total	507	78493	100.0		91897	100.0											1614.33		37.19						
Average				17.0																					
Per Acre	11.7	1808			2117								26.69	44.26	17.57		3.18		37.19						



NET LOG SCALE OVERRUN TABLES

For use in making physical and financial stand structure  
analyses of virgin northern hardwood stands in the Lake  
States

Percent overrun with ties not converted to 3A Com.  
lumber or no ties are cut

DBH	Sugar & Red Maple, Ash and oak**	Yellow Birch**	Basswood**	Elm**	Hemlock, White Pine White Spruce and Cedar***
12	36.0	38.5	31.0	47.0	56.0
14	28.5	33.5	26.0	38.5	47.5
16	24.5	29.0	21.0	32.0	40.0
18	21.0	25.0	18.0	26.0	35.0
20	18.0	21.5	15.0	20.5	30.0
22	15.0	18.5	12.0	17.0	27.0
24	11.5	15.5	10.0	13.5	25.0
26	8.5	13.0	9.0	10.5	23.0
28	5.5	11.5	8.0	7.5	21.5
30	2.5	10.5	7.0	5.0	19.5
32	-0.5	10.0	6.5	3.5	18.0
34	-3.0	9.5	6.0	2.0	16.5
36	-5.5	9.5	6.0	1.5	14.5
38	-	-	-	-	12.5
40	-	-	-	-	10.5

% over-run with ties con-  
verted to 3A Com. lbr.

DBH	Sugar Maple*	Yellow Birch*
12	16.0	18.5
14	18.5	21.5
16	18.5	23.5
18	16.0	23.0
20	13.5	19.5
22	11.0	14.0
24	9.0	11.0
26	6.5	9.0
28	4.0	8.0
30	1.5	7.5
32	-1.0	7.5
34	-3.5	7.0
36	-6.0	7.0

Data sources -

- \* Trout Creek Mill Scale Study
- \*\* Phelps Mill Scale Study
- \*\*\* Bulletin 164, Selective  
Logging in the Northern  
Hardwoods of the Lake States.

(Based on Scribner Decimal C Log Rule.)





## LUMBER VALUE ADJUSTMENTS TO NEW STAND TABLES AND NEW PRICES

### FORM 88

#### DATA

1. Lumber price lists by grade and thickness for the species concerned. Preferably ceiling prices.

2. Form 86 previously completed for each individual species.

3. Form 87 TOTAL VOLUME TABLE section (Step 1) previously completed for individual species and all species combined.

#### TABLES

1. Average Lumber Value Calculation Sheets for each species. (Table 3)

2. SUMMARY OF VALUES PER MBM LUMBER TALLY BY TREE QUALITY. (Table 4)

#### FORMS

Form 88 - LUMBER VALUE ADJUSTMENTS TO NEW STAND TABLES AND NEW PRICES. One form is used for each species. A summary for all species combined is also prepared on this form.

#### METHOD

(Note: When this has been done for other cases and prices have not changed in the interim, use previously calculated average values per MBM)(page 59)

##### a. New price list average value per MBM calculation for each species

1. Enter the identity of the price list, the date the price list was issued and the fob location considered in the price list in the blank spaces provided in the upper right corner of the AVERAGE LUMBER VALUE CALCULATION SHEET for the species.

2. Enter the prices from the price list opposite corresponding grade thicknesses in the column headed Price per MBM. (Check - copy check)

3. Multiply the price per MBM by the corresponding INDEX figure and enter the product to the nearest mil in the column labeled Fractional Value. (Check - machine multiplication check)

4. Add the fractional value column down and, taking the total to the nearest cent, list it in the blank space following the words Average value per MBM above date.

THIS COMPLETES THE CALCULATION OF THE AVERAGE VALUE PER MBM FOR THE SPECIES.

b. Individual species forms 88

1. In columns 1, 4, 7 and 10 enter log scale volumes by quality groups and total from column 8, 16, 24 and 26 of Form 86. (Check - copy check) Omit this step for Red maple, elm, hemlock, white spruce and white pine.

2. In column 2, 5, and 8 enter the value per M for each quality and dbh class from the SUMMARY OF VALUES PER MBM LUMBER TALLY BY TREE QUALITY. (Table 4) page 71. For red maple, elm, hemlock, white spruce and white pine record in column 12 instead of 2, 5, and 8, and skip to step 5. (Check - copy check) Make line and column position check.

3. Multiply and cross add columns as follows:

Multiply:

$$1 \times 2 = 3$$

$$4 \times 5 = 6$$

$$7 \times 8 = 9$$

Add:

$$3 + 6 + 9 = 11$$

Before proceeding with next step check the cut and leave blocks by cross totalling. Sum of columns 3, 6 and 9 equals sum of column 11.

4. Divide column 11 by column 10 to get column 12 - trial-case value per M lumber tally. (Check - machine division check)

5. In columns 13 and 18 enter the lumber volume by diameter classes and totals for Cut, Leave and Total Stands from column 5 of Form 87. (Check - copy check)

6. Multiply values per M in column 12 by the corresponding dbh lumber volume in column 13 to get the Trial Total Value to list in column 14. (Check - machine multiplication check)

7. Add down column 14 in the cut and leave blocks to get totals A and B. (Check adding machine tape)

8. Add totals A and B, column 14 to get total C. (Check adding machine tape)

9. Enter case lumber volume column 13 total C in column 18 total D block.

10. In total D block column 20 enter the new average lumber value per M for the species from the "AVERAGE VALUE PER MBM ABOVE DATE." (Check - copy check) (page 61)

11. Multiply the total lumber volume in the case (Total D column 18) by the average lumber value per M (Total D column 20) to get the total value of all the lumber of that species in the case (Total D column 19). (Check - machine multiplication check)

12. Divide the actual total value of the lumber in the case (Total D column 19) by the trial total value (Total C column 14) to get the value level adjustment factor. List this factor vertically in column 15, cut and leave blocks. Calculate this factor to 6 decimal places. (Check - machine division check)

13. Multiply each T. C. Value per M in column 12 by the factor in column 15 to get the actual case value per M lumber tally. List this value in column 16. (Check - machine multiplication check) For red maple, elm, hemlock, white spruce and white pine values per M cut and leave are the same.

14. Multiply the value per M in column 16 by the corresponding dbh lumber volume in column 13 to get the total value of the lumber in each diameter class. (Check - machine multiplication check)

15. Add column 17 down in both the cut and leave blocks to get the total value of the lumber cut and left to be entered on lines for totals A and B in column 17. (Check - adding machine tape)

16. Add column 17 totals A and B together to get the total value of the lumber in the case and enter the figure in Total C column 17. (Check - this total should differ only by a few cents from Total D column 19, adding machine tape check), also

$$\frac{\text{Total C value column 17}}{\text{Total C volume column 13}} = \text{Same as Total D column 20}$$

If error uncovered locate it as follows:

Factor x Total A, Col. 14 closely approximates Total A, col. 17.

This applies also to Total B and cols. 14 and 17. Do this for each diameter class if errors found in block.

17. Divide the total lumber value in the Cut, Leave and Total Stand Blocks (column 17 in Total A, B, and C) by the total total lumber volume in the cut, leave and total blocks (columns 13 in Total A, B, and C) to get the average value per M of lumber in the cut, leave and Total Stand Blocks to be entered in column 16 on the total A, B, and C lines. (Check - machine division.)

18. Divide the total lumber value in the Cut and Leave (column 17, total A & B) by the number of acres in the area sampled (listed in sheet heading) to get the value per acre in the Cut and Leave blocks. Also add value per acre A & B column 17 to get total value per acre C column 17. (Check - machine division for A, B, & C. Assume added value - column 17 total value per acre - correct if within a few cents of the value found by division.)

19. Add by corresponding diameters cut and leave Total values in column 17 and enter on corresponding dbh line in Total Stand Block column 19. Add column 19 down as cross-check on col. 17. By dbh classes: Divide Total Value column 19 in the Total Stand Block by the Lumber Volume by corresponding dbh in column 18 and list in column 20. EXCEPTIONS: For red maple, elm, hemlock, cedar, white spruce and white pine copy value per M lumber tally directly by dbh classes from column 16 to column 20.

19a. Next complete all species summary Form 88. Instructions on page 54.

20. Block E is worked after Form 87 is completed.

(a) Enter cut (in column 22) and leave (in column 23) average Value per M, Marginal Value per M and Cost per M from average lines of columns 14, 16 and 12 of Form 87. (Check - copy check)



(b) Multiply costs per M cut and leave (costs columns 22 and 23) (Block E) by the total lumber volumes cut and leave (Totals A and B column 13) to get the total cost cut and total cost leave (Total Cost columns 22 and 23). (Check - machine multiplication check)

(c) Divide these total costs cut and leave by the number of acres sampled (see top of sheet) to get the cost per acre cut and cost per acre leave to be listed in columns 22 and 23 opposite per acre. (Check - machine division check)

THIS COMPLETES THE WORK ON INDIVIDUAL SPECIES FORMS 88.

c. All Species Summary Form 88

1. From individual Species Forms 88 add by dbh classes the total values in column 17 for Cut and Leave and in column 19 for Total Stand. Enter these sums in columns 17 and 19 of the All Species summary form 88.

2. Add down column 17 for cut and for leave listing the totals cut and leave separately in the Total A and B lines in column 17. Add totals A and B column 17 and list in column 17 total C. Addition of items in column 19 should equal total C column 17. (Check - adding machine tape. Line and column position check)

3. From the Summary Form 87 total volume table section, column 5, list in column 13 for cut and leave and in column 18 for the total stand the total case volume lumber tally by diameter classes. On lines Totals A and B and C of column 13 list respectively the total case volumes for cut, leave and total stand. (Check - copy check)

4. For cut and leave and totals, divide the total values in column 17 by the lumber volume in column 13 to get the average value per M lumber tally column 16. For total stand dbh classes divide column 19 by column 18 and list in column 20. (Check - machine division check)

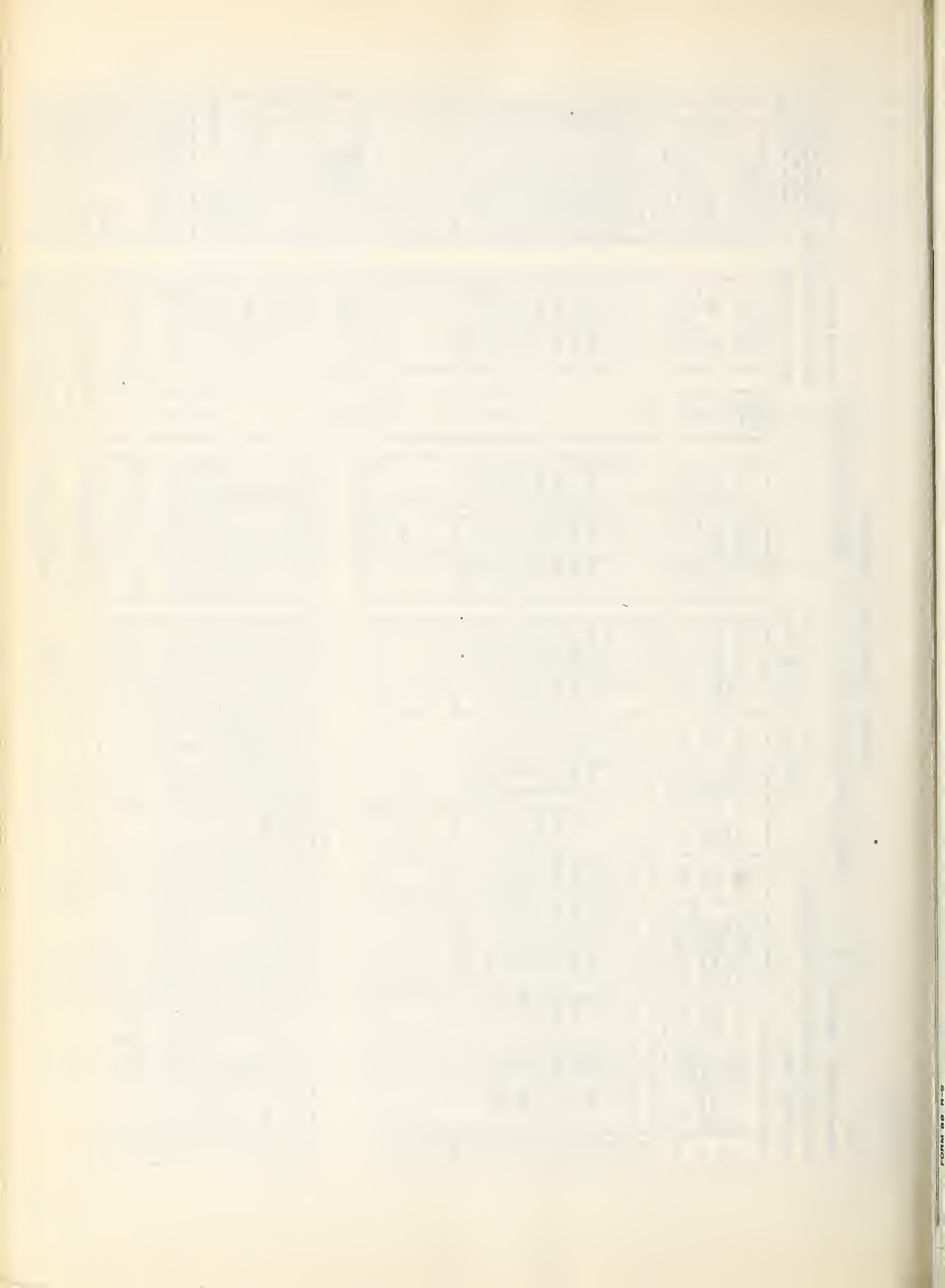
5. Divide Total Values in column 17 on total A, B, and C lines by the number of acres sampled (see sheet heading) to get the value per acre cut, leave, and total stand. (Check - machine division check)

6. Block E is worked after the Summary Form 87 is completed. See above (20) under individual species Form 88, for instructions for this block). Check by adding total cost for each species to get total cost on the all species sheet. The two totals may disagree as much as 50¢ or a dollar.

THIS COMPLETES CALCULATIONS FOR THE ALL SPECIES SUMMARY FORM 88.







# STAND STRUCTURE ANALYSIS

LUMBER VALUE ADJUSTMENTS TO NEW STAND TABLES AND NEW PRICES

Company:

Species: All

Lumber Values Original: Tentative Ceiling

Date: July 1, 1942

Date Completed: Sept. 2, 1942

# STAND STRUCTURE ANALYSIS

LUMBER VALUE ADJUSTMENTS TO NEW STAND TABLES AND NEW PRICES

Company:

Species: All

Lumber Values Original: Tentative Ceiling

Date: July 1, 1942

Date Completed: Sept. 2, 1942

D	Quality 1			Quality 2			Quality 3			Sum 1, 2, & 3		
	Case Log Scale Volume (1)	T.C. Value per M Lbr.ally (2)	Total Value (3)	Case Log Scale Volume (4)	T.C. Value per M Lbr.ally (5)	Total Value (6)	Case Log Scale Volume (7)	T.C. Value per M Lbr.ally (8)	Total Value (9)	Case Log Scale Volume (10)	T.C. Value per M Lbr.ally (11)	Total Value (12)

12												
14												
16												
18												
20												
22												
24												
26												
28												
30												
32												
34												
36												
38												
40												

A. Trial Out Totals 66909

12												
14												
16												
18												
20												
22												
24												
26												
28												
30												
32												

B. Trial Leave Totals 309219

Adjustment Factor T.C. to Case (15)
-------------------------------------

--	--	--	--	--	--	--	--	--	--	--	--	--

Actual Cut Totals Value Cut per Acre 195.04

--	--	--	--	--	--	--	--	--	--	--	--	--

Actual Leave Totals Value Left per Acre 335.02

Actual Case Values		Stand Out	
Value	Total Lbr.ally Value	Value	Total Lbr.ally Value

41.90	49.78		
45.51	258.71		
43.57	2501.39		
45.87	1815.83		
50.61	1058.11		
52.65	1207.07		
56.25	1250.69		
49.46	1219.26		
52.49	836.94		
46.58	284.50		
67.91	191.50		
53.72	187.06		
49.93	139.81		
31.17	27.46		
72.16	36.80		
50.72	846.49		
	195.04		

Stand Left

32.61	306.83		
39.13	1245.43		
43.53	1068.85		
46.59	2185.73		
44.91	2394.54		
49.44	1846.03		
49.67	1799.69		
57.32	1699.25		
53.86	622.82		
47.07	244.46		
67.24	125.40		
47.02	1454.03		
	335.02		

Actual Cut & Leave Total Value per Acre 530.06

C. Trial Totals Cut & Leave 476128

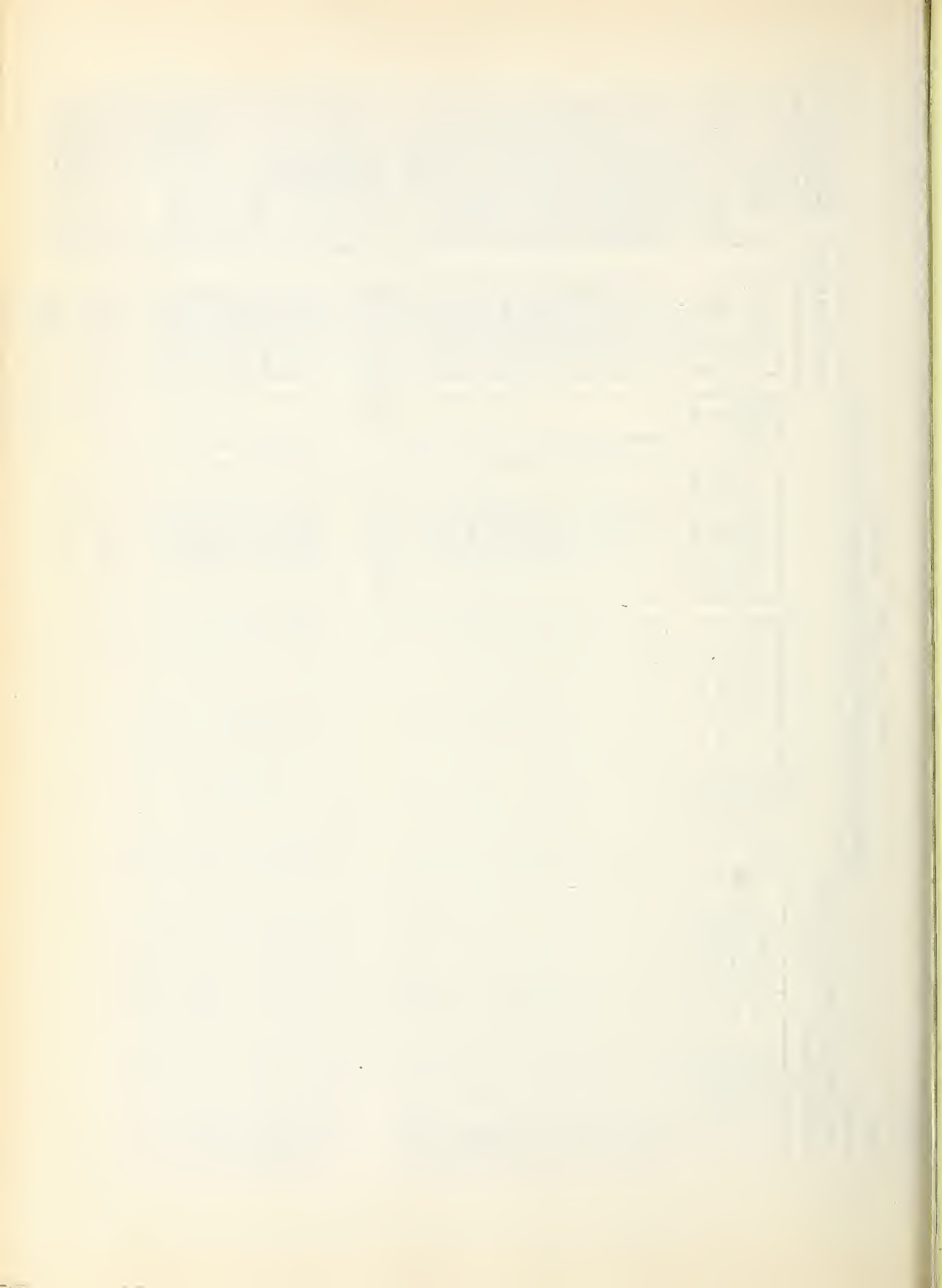
Method of Cut: Businessman's Selection  
Entered by: C.S.  
Area Sampled: 43.4 Acres  
Checked by: C.S. & W.B.  
Number of Plots: 217  
Worked by: C.S.  
Checked by: C.S. & W.B.

Actual Case Values		Total Stand	
Lumber Volume (18)	Total Value (19)	Lumber Volume (20)	Total Value (21)

7745	30683	39.61	
33015	1295.21	39.23	
50939	2228.50	43.75	
98725	2687.12	45.76	
71102	3210.37	45.15	
60267	3404.14	49.85	
64862	3506.76	50.98	
53660	3049.94	56.84	
36212	1842.08	50.87	
21140	1081.40	51.15	
7973	409.90	51.48	
2820	191.50	67.91	
3482	187.06	53.72	
2200	139.81	49.93	
881	27.46	31.17	
510	36.80	72.16	

Adjustment Factor Calculation		Totals D	
Case Lumber Volume (18)	Current Lumber Value (19)	Case Lumber Volume (20)	Current Lumber Value (21)

Cut & Leave Costs Block B		Per M.B.M.	
Average	Cut (21)	Leave (22)	Value (23)



AVERAGE VALUE CALCULATION SHEETS  
by  
SPECIES, LUMBER GRADE AND THICKNESS

THE UNIVERSITY OF CHICAGO  
LIBRARY



Average Value Calculation Sheet for Sugar Maple

			Price List	CEILING
			Date	SEPTEMBER 23, 1942
LUMBER*			F.O.B. MILL (Green Lumber)	
GRADE (%)	Thickness (%) in quarters	INDEX**	Price per MBM	Fractional value (carry mills)
FAS (6.1)	4 (21.9)	.013359	\$93.00	
	5 (51.8)	.031598	99.00	
	8 (24.8)	.015128	110.00	
	16 (1.5)	.000915	160.00	
Selects (5.7)	4 (35.8)	.020406	78.00	
	5 (44.8)	.025536	83.00	
	8 (17.8)	.010146	93.00	
	16 (1.6)	.000912	140.00	
No. 1 (18.3)	3 (.4)	.000732	50.00	
	4 (51.2)	.093696	58.00	
	5 (43.5)	.079605	63.00	
	6 (0.1)	.000183	67.00	
	8 (4.8)	.008784	74.00	
No. 2 (12.8)	3 (0.1)	.000128	40.00	
	4 (71.7)	.091776	43.00	
	5 (26.3)	.033664	46.00	
	8 (1.8)	.002304	50.00	
	12 (0.1)	.000128	56.00	
No. 3A (6.7)	4 (80.8)	.054136	30.00	
	5 (17.1)	.011457	33.00	
	8 (0.8)	.000536	36.00	
	16 (1.3)	.000871	29.00	
No. 3B (28.1)	4 (16.8)	.047208	26.00	
	5 (1.5)	.004215	27.00	
	8 (0.2)	.000562	28.00	
	12 (34.7)	.097507	28.00	
	16 (46.8)	.131508	29.00	
Ties to 3A (22.3)	4 (100.)	.223000	30.00	
			1.000000	44.371836

Average Value per MBM above date \$44.37

\*Trout Creek Mill Scale Study Total Stand Data.

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.

TABLE 3

## YELLOW BIRCH

2

## Average Value Calculation Sheet for Yellow Birch

Price List CEILING

Date SEPTEMBER 23, 1942

LUMBER\*

F.O.B. MILL (Green Lumber)  
Fractional value  
(carry mills)

GRADE (%)	Thickness (%) in quarters	INDEX**	Price per MBM	
FAS (14.7)	4 (10.4)	.015288	114.00	
	5 (89.6)	.131712	119.00	
Selects (9.2)	4 (22.6)	.020792	99.00	
	5 (76.7)	.070564	104.00	
	6 ( 0.5)	.000460	106.00	
	8 ( 0.2)	.000184	113.00	
No. 1C (17.9)	3 ( 0.3)	.000537	60.00	
	4 (35.0)	.062650	65.00	
	5 (63.1)	.112949	73.00	
	6 ( 1.5)	.002685	79.00	
	8 ( 0.1)	.000179	89.00	
No. 2C (15.4)	3 ( 0.1)	.000154	35.00	
	4 (49.0)	.076460	43.00	
	5 (47.4)	.072996	50.00	
	6 ( 2.8)	.004312	56.00	
	8 ( 0.7)	.001078	61.00	
No. 3 (5.2)	3 ( 0.1)	.000052	35.00	
AC	4 (57.3)	.029796	36.00	
	5 (25.0)	.013000	37.00	
	6 ( 5.7)	.002964	38.00	
	8 (10.1)	.005252	39.00	
	16 ( 1.8)	.000936	29.00	
No. 3 (30.7)	4 (12.4)	.038068	28.00	
BC	5 ( 9.7)	.029779	29.00	
	6 (12.8)	.039296	29.00	
	8 (48.8)	.149816	29.00	
	12 (11.8)	.036226	28.00	
	16 ( 4.5)	.013815	29.00	
Ties Conv.				
to 3 AC (6.9)	4 (100.0)	.069000	36.00	

1.000000

59.899989

Average Value per MBM above date 59.90

\*Trout Creek Mill Scale Study Total Stand Data.

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.

TABLE 3  
BASSWOOD

3

Average Value Calculation Sheet for Basswood

Price List    CEILING

Date        SEPTEMBER 23, 1942

LUMBER*		r.O.B. MILL (Green Lumber)		
GRADE (%)	Thickness (") in quarters	INDEX**	Price per MBM	Fractional value (carry mills)
FAS (19.4)	3 ( 0.1)	.000194	\$72.00	
	4 (98.3)	.190702	85.00	
	5 ( 0.8)	.001552	90.00	
	12 ( 0.8)	.001552	109.00	
SEL. (7.7)	4 (95.1)	.073227	75.00	
	5 (3.1)	.002387	80.00	
	12 (1.8)	.001386	99.00	
No. 1C (16.7)	3 (0.6)	.001002	43.00	
	4 (96.0)	.160320	50.00	
	8 (2.5)	.004175	69.00	
	12 (0.9)	.001503	81.00	
No. 2C (19.2)	3 (0.1)	.000192	31.00	
	4 (90.1)	.172992	37.00	
	8 (7.7)	.014784	44.00	
	12 (2.1)	.004032	57.00	
No. 3AC (19.1)	4 (25.2)	.048132	28.00	
	8 (74.8)	.142868	29.00	
No. 3BC (17.9)	4 (14.3)	.025597	28.00	
	8 (85.7)	.153403	29.00	
		1.000000	48.764836	

Average value per MBM above date \$48.76

\*Trout Creek Mill Scale Study Total Stand Data

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.

TABLE 3  
RED MAPLE  
4

Average Value Calculation Sheet for Red Maple

		Price List		CEILING
		Date		SEPTEMBER 23, 1942
LUMBER*		F.O.D. MILL (Green Lumber)		Fractional Value
GRADE (%)	Thickness (%) in quarters	INDEX**	Price per LBM	(carry mills)
FAS (6.9)	4 (55.5)	.038295	71.00	
	5 ( 3.4)	.002346	76.00	
	8 (41.1)	.028359	91.00	
-----				
Sel. (6.0)	4 (83.7)	.050220	51.00	
	5 (16.3)	.009780	56.00	
-----				
No. 1C (16.5)	3 ( 1.2)	.001980	50.00	
	4 (79.5)	.131175	51.00	
	5 ( 2.6)	.004290	56.00	
	8 (16.7)	.027555	66.00	
-----				
No. 2C (16.7)	4 (86.9)	.145123	37.00	
	5 (4.2)	.007014	41.00	
	8 (8.9)	.014863	47.00	
-----				
No. 3AC (1.4)	4 (100.0)	.014000	27.00	
-----				
No. 3BC (52.5)	4 (14.5)	.076125	27.00	
	8 (0.8)	.004200	30.00	
	12 (48.0)	.252000	28.00	
	16 (36.7)	.192675	29.00	
		1.000000	38.993241	

Average value per LBM above date \$38.99

\*Trout Creek Mill Scale Study Total Stand Data

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.

Average Value Calculation Sheet for Elm (Soft)

Price List      CEILING

Date      SEPTEMBER 23, 1942

LUMBER\*

F.O.B. MILL (Green Lumber)

<u>GRADE (%)</u>	<u>Thickness (%)</u> <u>in quarters</u>	<u>INDEX**</u>	<u>Price per LBM</u>	<u>Fractional value</u> <u>(carry mills)</u>
FAS (29.9)	4 (15.1)	.045149	\$60.00	
	6 ( 1.3)	.007887	65.00	
	8 (83.6)	.249964	68.00	
-----				
Sel. (13.9)	4 (34.3)	.047677	50.00	
	8 (65.7)	.091323	56.00	
-----				
No. 1C (12.4)	3 ( 1.8)	.002232	48.00	
	4 (46.4)	.057536	50.00	
	8 (51.8)	.064232	56.00	
-----				
No. 2C (15.2)	4 (56.5)	.085880	39.00	
	8 (43.5)	.066120	42.00	
-----				
No. 3AC ( 7.2)	4 (14.9)	.010728	27.00	
	8 (85.1)	.061272	29.00	
-----				
No. 3BC (21.4)	4 (19.8)	.042372	27.00	
	8 (80.2)	.171628	29.00	
1.000000			48.352173	

Average value per LBM above date \$48.35

\*Trout Creek Mill Scale Study Total Stand Data

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.



TABLE 3  
BLACK ASH  
6

Average Value Calculation Sheet for Black Ash

Price List      CEILING

Date      SEPTEMBER 23, 1942

LUMBER*		F.O.B. MILL (Green Lumber)		
GRADE (%)	Thickness (%) in quarters	INDEX**	Price per MBM	Fractional value (carry mills)
PAS (17.1)	4 (76.9)	.131499	\$75.00	
	6 (23.1)	.039501	85.00	
-----				
Sel. (5.9)	4 (75.7)	.044663	60.00	
	6 (24.3)	.014337	70.00	
-----				
No. 1C (17.4)	4 (81.3)	.141462	47.00	
	6 (10.6)	.018444	55.00	
	8 ( 8.1)	.014094	59.00	
-----				
No. 2C (16.5)	4 (80.0)	.13200	36.00	
	8 (20.0)	.033000	45.00	
-----				
No. 3AC (5.7)	4 (41.7)	.023769	27.00	
	8 (58.3)	.033231	29.00	
-----				
No. 3BC (37.4)	4 (25.1)	.093874	27.00	
	6 ( 1.1)	.004114	28.00	
	8 (73.8)	.276012	29.00	
		1.000000	43.894660	

Average value per MBM above date \$43.89

\*Trout Creek Mill Scale Study Total Stand Data.

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.



Average Value Calculation Sheet for Red Oak

Price List \_\_\_\_\_

Date \_\_\_\_\_

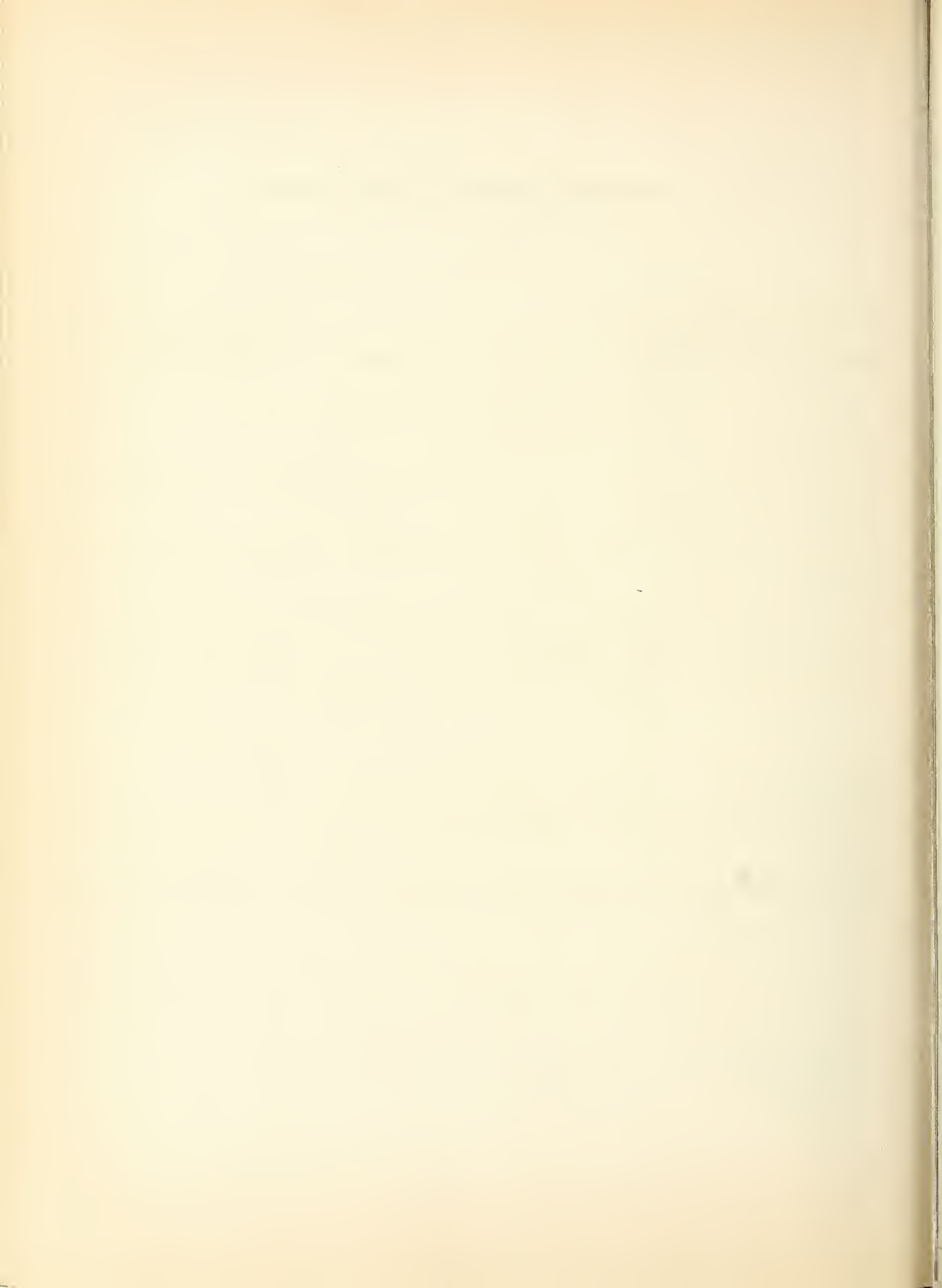
FOB \_\_\_\_\_

LUMBER*			Fractional value	
GRADE (%)	Thickness (%) in quarters	INDEX**	Price per MBM	(carry mils)
FAS (14.8)	3 (100.0)	.148000		
-----				
No. 1C (33.3)	5 (100.0)	.333000		
-----				
No. 2C (1.4)	6 (100.0)	.014000		
-----				
No. 3AC (13.9)	8 (100.0)	.139000		
-----				
No. 3BC (36.6)	12 (100.0)	.366000		
-----				

Average value per MBM above date \_\_\_\_\_

\*Trout Creek Mill Scale Study Total Stand Data

\*\*Index- The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.



Average Value Calculation Sheet for Hemlock

Price List      CEILING

Date      SEPTEMBER 23, 1942

LUMBER*		F.O.B. HILL (Green Lumber)		
GRADE (%)	Thickness (%) in quarters	INDEX **	Price per MBM	Fractional value (carry mils)
No. 1C (46.3)	4 (3.4)	.015742	\$38.50	
	8 (90.8)	.420404	38.00	
	16 (5.8)	.026854	40.50	
-----				
No. 2C (14.6)	4 (4.2)	.006132	36.00	
	6 (.3)	.000438	36.00	
	8 (95.5)	.139430	35.50	
-----				
No. 3C (6.8)	4 (29.0)	.019720	35.00	
	8 (71.0)	.048280	32.00	
-----				
No. 4C (26.6)	4 (1.0)	.002660	25.50	
	8 (99.0)	.263340	25.00	
-----				
No. 5C (5.7)	4 (5.9)	.003363	25.50	
	8 (94.1)	.053637	25.00	
1.000000			33.168462	

Average Value per MBM above date      \$33.17

\*Trout Creek Hill Scale Study Total Stand Data

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.

TABLE 3  
WHITE SPRUCE  
8

Average Value Calculation Sheet for White Spruce

Price List      CEILING

Date      SEPTEMBER 23, 1942

LUMBER*		F.O.B. MILL (Green Lumber)		
GRADE (%)	Thickness (%) in quarters	INDEX**	Price per MBM	Fractional value (carry mils)
No. 1C (85.6)	4 (2.0)	.017120	\$39.00	
	8 (67.8)	.580368	40.00	
	16 (30.2)	.258512	41.00	
-----				
No. 2C (10.2)	8 (100.0)	.102000	38.50	
-----				
No. 3C (3.1)	4 (27.3)	.008463	40.00	
	8 (72.7)	.022537	34.00	
-----				
No. 5C (1.1)	4 (100.0)	.011000	30.00	
1.000000			39.79	

Average value per MBM above date \$39.79

\*Trout Creek Mill Scale Study Total Stand Data

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.

Average Value Calculation Sheet for White Pine

Price List      CEILING

Date      SEPTEMBER 23, 1942

LUMBER\*

F.O.B. MILL (Green Lumber)

GRADE (%)	Thickness (%) in quarters	INDEX**	Price per MBM	Fractional value (carry mils)
-----------	------------------------------	---------	---------------	----------------------------------

Shop (19.3)	4 (26.1)	.050373	47.00	
	5 (17.0)	.032810	64.50	
	6 ( 5.7)	.011001	68.50	
	8 (51.2)	.098816	73.50	

B & Btr. (24.4)	4 (20.1)	.049044	90.00	
	5 ( 7.4)	.018056	128.50	
	6 ( 2.5)	.006100	128.50	
	8 (26.9)	.065636	133.50	
	12 ( 9.0)	.021960	181.50	
	16 (34.1)	.083204	201.50	

No. 1C (40.9)	4 (32.3)	.132107	56.00	
	5 (4.8)	.019632	77.50	
	8 (42.8)	.175052	77.50	
	12 ( 5.9)	.024131	81.50	
	16 (14.2)	.058078	90.50	

No. 2C (9.6)	4 (66.5)	.063840	51.00	
	5 ( 5.4)	.005184	62.50	
	8 (20.7)	.019872	62.50	
	16 ( 7.4)	.007104	69.50	

No. 3C (4.3)	4 (35.2)	.015136	45.00	
	5 ( 3.3)	.001419	48.50	
	8 (61.5)	.026445	48.50	

No. 4C (1.5)	4 (51.6)	.007740	38.00	
	8 (48.4)	.007260	38.50	

1.000000

87.16

Average value per MBM above date \$87.16

\*Trout Creek Mill Scale Study Total Stand Data

\*\*Index -- The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.



TABLE 3  
NORTHERN WHITE CEDAR  
10

Average Value Calculation Sheet for Cedar

Price List

Date

F.O.B.

LUMBER\*

<u>GRADE (%)</u>	<u>Thickness (%) in quarters</u>	<u>INDEX**</u>	<u>Price per MBM</u>	<u>FRACTIONAL VALUE (carry mills)</u>
No. 1C (3.8)	4 (100.0)	.038000		
-----				
No. 2C (3.8)	4 (100.0)	.038000		
-----				
No. 3C (63.6)	4 (100.0)	.636000		
-----				
No. 4C (25.0)	8 (100.0)	.250000		
-----				
No. 5C (3.8)	4 (100.0)	.038000		
-----				
		1.000000		

Average Value per MBM above date

\*Trout Creek Mill Scale Study Total Stand Data

\*\*Index - The proportion of lumber volume in each thickness and lumber grade in the average old growth northern hardwood stand for average milling conditions.

SUMMARY OF VALUES PER MBM LUMBER TALLY BY TREE QUALITY

TROUT CREEK  
(For use with Form 88)

DBH	Sugar Maple unconverted			Yellow Birch Unconverted			Basswood		
	Black Ash						Quality (2)*		
	Quality			Quality			Quality		
	1	2	3	1	2	3	1	2	3
12	-	23.80	23.00	-	24.50	21.60	-	32.60	32.60
14	31.00	26.20	24.20	36.30	28.50	24.40	42.00	33.70	33.70
16	33.50	28.70	25.40	39.80	32.20	27.30	43.00	35.00	35.00
18	35.80	31.20	26.50	43.00	35.50	30.10	43.90	36.10	36.10
20	37.80	33.30	27.70	46.00	38.20	32.40	44.30	37.20	37.20
22	39.80	35.20	28.90	49.00	41.00	34.10	45.70	38.10	38.10
24	42.20	37.00	30.00	51.70	43.20	36.00	46.60	38.90	38.90
26	45.20	38.70	31.10	53.90	45.00	37.40	47.50	39.60	39.60
28	48.60	40.20	32.30	55.50	46.60	38.50	48.40	40.10	40.10
30	52.50	41.60	33.50	57.00	48.00	39.30	49.20	40.60	40.60
32	56.60	42.90	34.60	58.30	49.00	39.80	49.90	41.00	41.00
34	60.70	44.20	35.80	59.40	49.50	40.00	50.60	41.20	41.20
36	64.70	45.60	36.90	60.30	49.70	40.00	51.10	41.40	41.40

DBH	Red Maple*	Elm*	Hemlock*	White Spruce*
	All Qualities	All Qualities	All Qualities	All Qualities
12	29.80	19.50	27.20	63.41
14	29.10	22.40	26.80	69.00
16	28.60	25.10	26.30	74.44
18	28.00	27.80	25.80	80.00
20	27.30	30.20	25.00	86.00
22	26.80	32.30	24.50	91.00
24	26.10	34.70	24.00	97.00
26	25.50	37.00	23.60	102.00
28	24.90	39.00	23.40	107.00
30	24.20	40.90	23.20	111.50
32	23.80	42.60	23.00	115.50
34	23.10	44.20	22.80	119.50
36	22.50	46.00	22.60	122.50
38		47.60	22.40	126.00
40			22.20	129.00
42			22.00	131.00
44			21.80	133.50
46			21.60	135.50
48			21.40	137.00
50			21.20	138.50

\*For red maple, elm, hemlock and white spruce the data were insufficient to draw separate curves by quality classes. For basswood, quality 3, insufficient data available. Use hemlock for cedar and white spruce for white pine.

Table 4

## SUMMARY OF VALUES FOR BIRCH LUMBER TALLY BY TREE

## QUALITY - TROUT CREEK

(Ties converted to 3A lumber)

DBH	Sugar Maple (Ties Converted)			Yellow Birch (Ties Converted)		
	Quality			Quality		
	1	2	3	1	2	3
12	-	21.30	20.60	-	23.20	21.00
14	29.30	24.10	21.90	37.00	28.50	23.70
16	31.80	27.10	23.10	40.10	32.20	26.30
18	34.10	29.60	24.70	43.20	35.50	29.00
20	36.20	32.10	26.30	46.00	38.20	31.40
22	38.40	34.10	27.60	49.00	41.00	33.70
24	41.30	36.00	29.00	51.70	43.20	35.60
26	44.90	37.90	30.20	53.90	45.00	37.40
28	48.60	39.80	31.80	55.50	46.60	38.50
30	52.50	41.60	33.20	57.00	48.00	39.30
32	56.60	42.90	34.50	58.30	49.00	39.80
34	60.70	44.20	35.80	59.40	49.50	40.00
36	64.70	45.60	36.90	60.30	49.70	40.00

Table 4A

SUMMARY OF VALUES PER 11 NET LOG SCALE BY TREE QUALITY-TROUT CREEK

(For use on Form 88 in logging value estimates)

D B H	Sugar Maple (Unconv.)			Yellow Birch (Unconv.)			Basswood		
	Beach Ash								
	Q u a l i t y			Q u a l i t y			Q u a l i t y		
	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u> (2)*
12	-	32.37	31.28	-	33.93	29.92	-	42.71	42.71
14	39.84	33.67	31.10	48.46	38.05	32.57	52.92	42.46	42.46
16	41.71	35.73	31.62	51.34	41.54	35.22	52.03	42.35	42.35
18	43.32	37.75	32.06	53.75	44.38	37.62	51.80	42.60	42.60
20	44.60	39.29	32.69	55.89	46.41	39.37	51.52	42.78	42.78
22	45.77	40.48	33.24	58.06	48.58	40.41	51.13	42.67	42.67
24	47.05	41.26	33.45	59.71	49.90	41.58	51.26	42.79	42.79
26	49.04	41.99	33.74	60.91	50.35	42.26	51.78	43.16	43.16
28	51.27	42.41	34.08	61.88	51.96	42.93	52.27	43.31	43.31
30	53.81	42.64	34.34	62.98	53.04	43.43	52.64	43.44	43.44
32	56.32	42.68	34.43	64.13	53.90	43.78	53.14	43.67	43.67
34	58.88	42.87	34.73	65.04	54.20	43.80	53.64	43.67	43.67
36	61.14	43.09	34.87	66.03	54.42	43.80	54.17	43.88	43.88

	<u>Red Maple*</u>	<u>Elm*</u>	<u>Hemlock*</u>	<u>White Spruce*</u>
	<u>All Qualities</u>	<u>All Qualities</u>	<u>All Qualities</u>	<u>All Qualities</u>
12	40.53	28.66	42.43	98.92
14	37.39	31.02	39.53	101.78
16	35.61	33.13	36.82	104.22
18	33.38	35.03	34.83	108.00
20	32.21	36.39	32.50	111.80
22	30.82	37.79	31.12	115.57
24	29.10	39.38	30.00	121.25
26	27.67	40.38	29.03	125.46
28	26.27	41.92	28.43	130.00
30	24.80	42.94	27.72	133.24
32	23.68	44.09	27.14	136.29
34	22.41	45.08	26.56	139.22
36	21.26	46.69	25.88	140.26
38			25.20	141.75
40			24.53	142.55

\*For red maple, elm, hemlock and white spruce the data were insufficient to draw separate curves by quality classes. For basswood, quality 3, insufficient data available. Use hemlock for cedar and white spruce for white pine.

Table 4A

SUMMARY OF VALUES PER MBF NET LOG SCALE BY TREE QUALITY  
 TROUT CREEK  
 (Ties Converted to 3A Lumber)

D B H	Sugar Maple			Yellow Birch		
	Q u a l i t y			Q u a l i t y		
	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>
12	-	28.97	28.02	-	32.13	29.08
14	37.65	30.97	28.14	49.40	38.05	31.64
16	39.59	33.74	28.76	51.73	41.54	33.93
18	41.26	35.82	29.89	54.00	44.38	36.25
20	42.72	37.88	31.03	55.89	46.41	38.15
22	44.16	39.22	31.74	58.06	48.58	39.93
24	46.05	40.14	32.34	59.71	49.90	41.12
26	48.72	41.12	32.77	60.91	50.85	42.26
28	51.27	41.99	33.55	61.88	51.96	42.93
30	53.81	42.64	34.03	62.98	53.04	43.43
32	56.32	42.68	34.33	64.13	53.90	43.78
34	58.88	42.87	34.73	65.04	54.20	43.80
36	61.14	43.09	34.87	66.03	54.42	43.80



ADJUSTMENT OF COSTS TO NEW STAND TABLES AND COMPANY COSTS

Form 89

DATA - 1. Total Company operating cost data either on a log scale or lumber tally basis.

2. Completed all species summary forms 87 TOTAL VOLUME TABLE sections.

TABLES - AVERAGE LOGGING AND MILLING COSTS - TROUT CREEK (Table 5).

FORMS - Form 89 - ADJUSTMENTS TO NEW STAND TABLES AND COMPANY COSTS.  
One form is used for each case.

METHOD:

a. Conversion of all costs to a lumber tally basis.

1. Divide total company logging costs per 1" log scale by the average overrun for all species from bottom of column 4 for Total Stand block on all Species Summary Form 87 to get logging costs based on lumber tally volume.  
(Check - machine division check)

2. Add logging and milling costs together on a lumber tally basis and enter the sum in the Total Stand Block in the space labeled Case Operation Average at the bottom of column 10 on form 89. (Check - adding machine tape, copy check.)

b. Calculation of case costs per M lumber tally.

1. Under proper species headings list in column 1 on form 89 the case lumber volumes by dbh class and total from column 5 of the Total Stand blocks in the TOTAL VOLUME TABLE section on individual forms 87. In the Total Stand block, column 6, list the total lumber volume by dbh class and total for all species combined from Form 87. (Check - copy check)

2. From the table of AVERAGE LOGGING AND MILLING COSTS - TROUT CREEK (Table 5) list the total cost lumber tally for proper species and dbh class in column 2 opposite volumes entered in column 1. (Check - copy check)

3. Multiply case volumes (column 1) by the Cost per 1. (column 2) to get the Trial Total cost (column 3). (Check - machine multiplication check)

4. Add total trial cost by dbh classes for all species together and list in corresponding dbh class for Total Stand block in column 8. (Check - adding machine tape)

5. Total all columns 3 and column 8 listing sums on respective Total lines. (Check - adding machine tape. Sum of totals of all species added together should equal Total of column 8).

6. Divide column 8 by dbh class and total by the corresponding lumber volumes in column 6 to get the average T.C. cost per M to enter in column 7. Also divide totals of column 3 in all species blocks by the total lumber volume for the species (total column 1) to get the species average trial cost per MBM. (Check - machine division check)

7. Calculate cost level adjustment factor as indicated on form.

(a) Multiply Case Operation Average Cost (Average line Col. 10) by the total case volume (Total col. 6) and get Case Total Cost. (Check - machine multiplication check)

(b) Divide Case Total Cost by the Trial Total Cost (Total Col. 8) to get the factor. Carry out to 6 decimal places and list same factor vertically in each species block factor column 4 and 9, Total stand block. (Check - machine division check)

8. Multiply value in each dbh and total in column 2 by the factor to get the corresponding Case Cost per M to list in column 5. Similarly multiply values in column 7 by factor to get cost per M by dbh and total for the Total Stand.

THIS COMPLETES COST ADJUSTMENTS TO NEW STAND TABLES AND COMPANY COSTS.







Table 5

AVERAGE LOGGING AND MILLING COSTS - TROUT CRELK  
(Use with Form 89)

TOTAL COSTS PER M

SUGAR MAPLE, RED MAPLE, BLACK ASH  
AND RED OAK

D	Log.		Log.	Mill.	Total
B	Cost		Cost	Cost	Cost
H	Log	Over-	Lbr.	Lbr.	Lbr.
	Scale	run	Tally	Tally	Tally*
12	19.49	36.0	14.33	15.44	29.77
14	16.95	28.5	13.19	15.51	28.70
16	14.90	24.5	11.97	15.62	27.59
18	13.46	21.0	11.12	15.51	26.63
20	12.42	18.0	10.53	15.39	25.92
22	11.65	15.0	10.13	15.21	25.34
24	11.24	11.5	10.08	15.04	25.12
26	10.85	8.5	10.00	14.83	24.83
28	10.63	5.5	10.08	14.62	24.70
30	10.40	2.5	10.15	14.37	24.52
32	10.28	-0.5	10.33	14.03	24.36
34	10.18	-3.0	10.49	13.88	24.37
36	10.06	-5.5	10.65	13.66	24.31

YELLOW BIRCH

Log.		Log.	Mill.	Total
Cost		Cost	Cost	Cost
Log	Over-	Lbr.	Lbr.	Lbr.
Scale	run	Tally	Tally	Tally*
19.78	38.5	14.28	15.91	30.19
17.29	33.5	12.95	15.84	28.79
15.15	29.0	11.74	15.75	27.49
13.46	25.0	10.77	15.68	26.45
12.36	21.5	10.17	15.51	25.68
11.43	18.5	9.65	15.39	25.04
10.93	15.5	9.46	15.21	24.67
10.54	13.0	9.33	15.08	24.41
10.31	11.5	9.25	14.96	24.21
10.16	10.5	9.19	14.79	23.98
10.02	10.0	9.11	14.65	23.76
9.90	9.5	9.04	14.55	23.59
7.81	9.5	7.13	14.48	21.61
				21.00

BASSWOOD

d	Log.		Log.	Mill.	Total
B	Cost		Cost	Cost	Cost
H	Log	Over-	Lbr.	Lbr.	Lbr.
	Scale	run	Tally	Tally	Tally*
12	19.22	31.0	14.67	22.65	37.32
14	16.70	26.0	13.25	21.80	35.05
16	14.60	21.0	12.07	21.22	33.29
18	12.99	18.0	11.01	20.67	31.68
20	11.82	15.0	10.28	20.32	30.60
22	11.03	12.0	9.85	19.98	29.83
24	10.55	10.0	9.59	19.67	29.26
26	10.16	9.0	9.32	19.37	28.69
28	9.90	8.0	9.17	19.13	28.30
30	9.72	7.0	9.08	18.90	27.98
32	9.59	6.5	9.00	18.66	27.66
34	9.46	6.0	8.92	18.49	27.41
36	9.31	6.0	8.78	18.29	27.07

ELM

Log.		Log.	Mill.	Total
Cost		Cost	Cost	Cost
Log	Over-	Lbr.	Lbr.	Lbr.
Scale	run	Tally	Tally	Tally*
19.87	47.0	13.52	16.63	30.15
16.80	38.5	12.13	15.97	28.10
14.35	32.0	10.87	15.33	26.20
12.58	26.0	9.98	14.66	24.64
11.46	20.5	9.51	14.03	23.54
10.67	17.0	9.12	13.41	22.53
10.10	13.5	8.90	12.82	21.72
9.71	10.5	8.79	12.29	21.08
9.51	7.5	8.85	11.80	20.65
9.36	5.0	8.91	11.28	20.19
9.21	3.5	8.90	10.84	19.74
9.18	2.0	9.00	10.56	19.56
9.16	1.5	9.02	10.34	19.36
				19.16
				18.90
				18.70

\*This column used except in special cases



Table 5

HEMLOCK, WHITE PINE, WHITE SPRUCE  
AND WHITE CEDAR

	Log.		Log.	Mill.	Total
D	Cost		Cost	Cost	Cost
B	Log	Over-	Lbr.	Lbr.	Lbr.
H	Scale	run	Tally	Tally	Tally*
12	20.10	56.0	12.88	16.63	29.51
14	17.59	47.5	11.93	15.97	27.90
16	15.17	40.0	10.84	15.33	26.17
18	13.49	35.0	9.99	14.66	24.65
20	12.38	30.0	9.52	14.03	23.55
22	11.55	27.0	9.09	13.41	22.50
24	10.88	25.0	8.70	12.82	21.52
26	10.41	23.0	8.46	12.29	20.75
28	10.03	21.5	8.26	11.80	20.06
30	9.75	19.5	8.16	11.28	19.44
32	9.47	18.0	8.03	10.85	18.88
34	9.28	16.5	7.97	10.46	18.43
36	9.12	14.5	7.97	10.08	18.05
38	9.05	12.5	8.04	9.75	17.79
40	9.00	10.5	8.14	9.45	17.59

TOTAL COST PER MAHLEN TIES CONVERTED TO 3A LUMBER

SUGAR MAPLE TIES CONVERTED						YELLOW BIRCH TIES CONVERTED					
	Log.		Log.	Mill.	Total		Log.		Log.	Mill.	Total
D	Cost		Cost	Cost	Cost	D	Cost		Cost	Cost	Cost
B	Log	Over-	Lbr.	Lbr.	Lbr.	B	Log	Over-	Lbr.	Lbr.	Lbr.
H	Scale	run	Tally	Tally	Tally*	H	Scale	run	Tally	Tally	Tally*
12	19.49	16.0	16.80	15.44	32.24	12	19.78	18.5	16.69	15.91	32.60
14	16.95	18.5	14.30	15.51	29.81	14	17.29	21.5	14.23	15.84	30.07
16	14.90	18.5	12.57	15.62	28.19	16	15.15	23.5	12.27	15.75	28.02
18	13.46	16.0	11.60	15.51	27.11	18	13.46	23.0	10.94	15.68	26.62
20	12.42	13.5	10.94	15.39	26.33	20	12.36	19.5	10.34	15.51	25.85
22	11.65	11.0	10.50	15.21	25.71	22	11.43	14.0	10.03	15.39	25.42
24	11.24	9.0	10.31	15.04	25.35	24	10.93	11.0	9.85	15.21	25.06
26	10.85	6.5	10.19	14.83	25.02	26	10.54	9.0	9.67	15.08	24.75
28	10.63	4.0	10.22	14.62	24.84	28	10.31	8.0	9.55	14.96	24.51
30	10.40	1.5	10.25	14.37	24.62	30	10.16	7.5	9.45	14.79	24.24
32	10.28	-1.0	10.38	14.03	24.41	32	10.02	7.5	9.32	14.65	23.97
34	10.18	-3.5	10.55	13.88	24.43	34	9.90	7.0	9.25	14.55	23.80
36	10.06	-6.0	10.70	13.66	24.36	36	7.81	7.0	7.30	14.48	21.78

\*This column used except in special cases

STEP II - MARGINAL VALUE CALCULATIONSa. Individual species forms 87

1. In column 12 opposite volumes in column 5 list the costs per M from column 5 on form 89. These costs are the same by dbh classes for the stand cut, stand left and the total stand. Do not list the average at the bottom of the column as this differs in all cases from that shown on Form 89. (Check - correct species, copy check)

2. In column 14 opposite the cost entries list the values per M from form 88 column 16 (for cut and leave) and column 20 (for total stand.) On the average lines at the bottom of column 14 list the average values per M for cut, leave and total stand blocks as shown on Form 88 in column 16 of the Totals A, B and C. (Check - correct species, copy check)

3. For each dbh class in the Cut, Leave and Total Stand blocks subtract the cost in column 12 from the value listed in column 14. List this marginal value per M for the dbh class in column 16. (Check - adding machine tape.)

4. For the Cut and Leave Block only multiply the marginal value per M in column 16 by the corresponding dbh class lumber volume in column 5. List this total marginal value for the dbh class in column 17. (Check - machine multiplication check).

5. For corresponding dbh classes add together the Cut and Leave Total marginal values in column 17 and enter the sum in the corresponding dbh class in column 17 in the total stand block. (Check - adding machine tape, Volume multiplied by marginal value per M by dbh classes in the total stand should approximately equal these sums.)

6. Total columns 17 in the Cut, Leave and Total Stand blocks. (Check - adding machine tape, cut total plus leave total should equal the total for the total stand.)

7. In each of the Cut, Leave and Total Stand blocks divide the total block marginal value (total column 17) by the total block lumber volume (total column 5) to get the average marginal value per M for the block. List this value on the average line in column 16. (Check - machine division check.)

8. For the Cut, Leave and Total Stand blocks subtract the total average marginal value (average column 16) from the corresponding total average lumber value (average column 14) to get the block average cost per M. List this figure on the block average line in column 12. (Check - adding machine tape.)

9. Divide dbh class and column total marginal values in column 17 by the corresponding number of trees in column 1 to get the marginal value per tree. List these values in column 18. (Check - machine division check.)

10. Divide dbh class total marginal values (column 17) for cut and leave blocks only, by the number of acres in the area sampled, (see sheet heading for area sampled), to get the marginal value per acre by diameter classes cut and leave. List these figures in column 19. (Check - machine division check)

11. Add together corresponding cut and leave dbh class marginal values per acre (columns 19) and list these total stand marginal value per acre figures in the total stand block on corresponding dbh lines in column 19. (Check - adding machine tape. In the total stand block, column 17 divided by the number of acres in the area sampled should approximate these sums very closely.)

12. Total the marginal value per acre columns for cut, leave and total blocks. Enter this figure also on the per-acre line at the bottom of column 17. (Check - adding machine tape. Total of cut plus total of leave should equal total of total stand.)

THIS CONCLUDES THE CALCULATION OF BASIC MARGINAL VALUES FOR SEPARATE SPECIES.

b. All species summary form 87

1. In column 14 opposite the volume entries in column 5 list the values per M from summary form 88, column 16 (for cut and leave) and column 20 (for total stand). On the average lines in column 14 list the average values per M for Cut, Leave and Total Stand blocks as shown on summary form 88 in column 16 of the Totals A, B and C. (Check - copy check)

2. Separately for Cut and Leave add together by diameter classes the total marginal values (column 17) from the individual species forms 87. Enter the sums on the corresponding dbh lines in the corresponding blocks on summary form 87. (Check - adding machine tape)\*

3. For corresponding diameter classes add the Cut and Leave marginal values together in column 17 to get the total stand marginal values by diameter classes.

4. Total columns 17 in the Cut, Leave and Total Stand blocks. (Check - adding machine tape, cut total plus leave total should equal the total for the total stand. Sum of block totals on individual species forms 87 should equal new totals in this step.)

5. Divide total marginal values (column 17) by the corresponding lumber volumes (column 5) to get the average marginal values. List the figures in column 16. (Check - machine division check)

6. In each block subtract the average marginal value per M (column 16) for each diameter class and the block total from the corresponding value per M (column 14) to get the average cost per M for the corresponding diameters and totals. List these figures in column 12 of the summary form 87. (Check - adding machine tape. Check total stand block costs by diameter and total against column 10, form 89).

\*Note: A simple method for making this summary is - (1) tabulate each sheet separately on the adding machine tape leaving a space where no value exists and always beginning with the 12" dbh class so that when totals at the bottom of each column are matched the dbh classes will also be matched. Now add on the machine all the 12" figures crossing out or otherwise indicating use of the figure as it is listed in the machine. The tapes will all cross-total if the work is done correctly.



7. Divide dbh class and column totals of Total Marginal Value in column 17 by the corresponding number of trees (column 1) to get the Marginal Value per Tree. List these values in column 18. (Check - machine division check)

8. Divide dbh class Total Marginal Values in column 17 for Cut and Leave blocks only, by the number of acres in the area sampled (see sheet heading for area sampled) to get the marginal value per acre by diameter classes cut and leave. List these figures in column 19. (Check - machine division check)

9. Add together the corresponding diameter class cut and leave marginal values per acre (column 19) and list these total stand marginal values per acre in the total stand block on corresponding dbh lines in column 19. (Check - adding machine tape; in the total stand block, column 17 divided by the number of acres in the area sampled should approximate these sums very closely.)

10. Total the marginal value per acre column (19) for Cut, Leave and Total Stand Blocks and list on total line for the block in column 19. Enter this figure also on the per-acre line at the bottom of column 17. (Check - adding machine tape; total of Cut plus total of Leave should equal total of the Total Stand.)

11. Refer to instructions for Block E, No. 20 in the instructions for calculating individual species forms 83. The calculation is carried out using the summary forms 87 and 88 instead of the separate species forms. The sum of the total costs by species from form 88, Block E, should approximately equal the total cost on the summary form 88, Block E. (See page 53, par. 20.)

THIS CONCLUDES THE CALCULATION OF BASIC MARGINAL VALUES FOR ALL SPECIES COMBINED.





# STAND STRUCTURE ANALYSIS

Company:

MARGINAL VALUE

CALCULATIONS

Method of Cut: *Businessman's*

*Selection*  
Entered by: *M.S.*  
Checked by: *M.S. & W.B.*  
Marked by: *M.S.*  
Checked by: *M.S.*

Species: *Sugar Maple*

Area Sampled: *42.4 Acres*

Costs-Original: *Current Average* Volume Table Used: *Poor*  
Date: *Sept. 1, 1942*

Lumber Values-Original: *Tentative Ceiling* Number of Plots: *217*  
Date: *July 4, 1942*

Date Completed: *Sept. 3, 1942*

D  B  H	TOTAL VOLUME TABLE						COST PER M.B.M.						VALUE PER M.B.M.		MARGINAL VALUES						(20)	(21)	(22)	(23)	(24)	(25)
	No. of trees	Net Log Scale		Mill over run	Lumber Tally		Net Log Scale			Lumber Tally			Net Log Scale (13)	Lumber Tally (14)	per M.B.M.		TOTAL (17)	Per Tree (18)	Per Acre (19)							
		Total	%		Total	%	Log-ging (7)	Mill-ing (8)	Total (9)	Log-ging (10)	Mill-ing (11)	Total (12)			Net Log Scale (15)	Lumber Tally (16)										
																				Net Log Scale (15)						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)								
12																										
14																										
16	8	620		24.5	772						28.13	38.72		10.57	8.18	1.02	.19									
18	22	2325		21.0	2813						27.15	38.60		11.39	32.04	1.46	.74									
20	22	3277		18.0	3867						26.42	43.33		16.98	65.35	2.97	1.51									
22	18	3224		15.0	3708						25.14	45.11		19.27	71.45	3.97	1.65									
24	25	5756		11.5	6418						25.61	49.02		23.41	150.25	6.01	3.46									
26	12	3328		8.5	3611						25.32	49.88		24.50	88.69	6.82	2.04									
28	7	1424		5.5	1513						24.18	50.65		25.67	38.54	6.51	.89									
30	3	666		2.5	683						25.00	58.25		33.25	22.71	7.57	.52									
32	1	177		-0.5	176						24.86	45.17		20.33	3.58	3.38	.08									
34	1	39		-3.0	38						24.82	57.70		32.85	1.25	1.25	.03									
36																										
38																										
40																										
Total	120	20846	100.0		23599	100.0										432.04		11.11								
Average				13.2							25.25	46.38		20.43		4.02										
Per Acre	2.8	480			5.44											11.11										

TOTAL STAND LEFT																									
12	27	871		36.0	1185							30.35	30.60	.25	.30	.01	.01								
14	102	6787		28.5	8721							29.26	33.70	4.44	38.72	.38	.89								
16	81	8497		24.5	10579							28.13	38.12	9.99	105.68	1.80	2.44								
18	62	8637		21.0	10451							27.15	40.09	12.89	124.71	2.17	3.10								
20	57	12441		18.0	14680							26.43	44.27	17.84	261.89	4.29	6.03								
22	27	1392		15.0	9651							25.84	46.86	21.02	202.86	7.51	4.67								
24	12	6253		11.5	5857							25.61	52.74	27.13	158.90	13.24	3.66								
26	7	3373		8.5	3660							25.32	54.36	29.04	106.29	15.18	2.45								
28	4	2246		5.5	2370							25.18	53.38	28.20	66.83	16.71	1.54								
30																									
32	1	1150		-0.5	1144							24.84	73.89	49.05	56.11	56.11	1.29								
Total	387	57647	100.0		68298	100.0											1132.29		26.08						
Average				18.4								26.95	43.53		16.58		2.93								
Per Acre	8.9	1328			15.73												26.08								

TOTAL STAND																									
12	27	871		36.0	1185							30.35	30.60	.25	.30	.01	.01								
14	102	6787		28.5	8721							29.26	33.70	4.44	38.72	.38	.89								
16	96	9117		24.5	11351							28.13	38.16	10.03	113.86	1.19	2.63								
18	84	10962		21.0	13264							27.15	39.71	12.56	116.75	1.39	3.84								
20	79	15718		18.0	18547							26.43	44.07	17.64	327.24	4.14	7.54								
22	45	11616		15.0	13359							25.84	46.37	20.53	274.31	6.10	6.32								
24	37	11009		11.5	12275							25.61	50.80	25.19	309.15	8.36	7.12								
26	20	6701		8.5	7271							25.32	52.14	26.82	194.98	9.75	4.49								
28	11	3680		5.5	3883							25.18	52.32	27.14	105.37	9.51	2.43								
30	3	666		2.5	683							25.00	58.24	33.24	82.71	7.67	.52								
32	2	1327		-0.5	1320							24.84	70.06	45.22	59.69	29.85	1.37								
34	1	39		-3.0	38							24.85	57.63	32.78	1.28	1.25	.03								
36																									
38																									
40																									
Total	507	78493	100.0		91897	100.0											1614.33		37.19						
Average				17.0								26.69	44.26		17.57		3.18								
Per Acre	11.7	1808			21.17												37.19								



Stand Structure Analysis - Volume Growth -  
Marginal Value Increase Calculations

Form 91

DATA: Case data for these computations are obtained from completed forms 87 and 92.

FORMS: Form 91, Volume Growth-Marginal Value Increase Calculations, will be used for these computations. One form is used for each species or species group. The all species summary is also made up on this form.

TABLES: (1) Survival Percent for all Species (Table 6); (2) Increase in Net Bd. Ft. Log Scale after selective logging (Table 7) for each species; (3) Change in Net Log Scale Overrun due to Growth after Selective Cutting (Table 8); (4) Selective Logging Growth Rate Tables (diameter increase) by species (Table 9).

METHOD:

a. Individual Species Form 91. (Group species as in Table 7).

Volume Growth

1. In column 1 of Form 91 insert the present net log scale volume for the species in the stand left from column 2 of Form 87. (Check - copy check, line-position check)

2. In column 2 of Form 91 insert for the dbh classes represented the Net Log Scale Survival percent from table 6, page 97, for the length of growth period considered. (Check - copy check, line-position check)

3. Multiply column 1 by column 2 and list the product in column 3 to the nearest board foot.

4. Total column 3. (Check - adding machine tape)

5. Divide the total of column 3 by the total of column 1. List the quotient which is the average net log scale survival percent in the Average block of column 2. (Check - machine division check)

6. In column 4 and 9 respectively, of Form 91, list by dbh classes and totals the numbers of trees from column 1 and 2, Form 92, page 6. (Check-copy check line and position check)

7. In columns 5 and 10 respectively, of Form 91, list the corresponding survival percents for <sup>page 97</sup> A & B combined and C vigor trees for the growth period used from Table No. 6, Survival Percent for all Species. (Check - copy, line and position check.)

8. Multiply column 4 by column 5 and column 9 by column 10 to get the future number of trees to list in columns 6 and 11 respectively. Carry to two decimal places. (Check - machine multiplication check)

(a) Total down columns 6 and 11. (Check adding machine tape)

(b) Divide Total column 6 by Total column 4 and Total column 11 by Total column 9 and list the quotient on the average line in columns 5 and 10 respectively. (Check - machine division check)

9. In columns 7 and 12 respectively, list the net volume increase per tree for A and B vigor combined, and for C trees from Table No. 7, page 99, Increase in Net Bd. Ft. Log Scale After Selective Logging, for the proper species. (Check - copy, line and position check)

10. Multiply column 6 by column 7 and column 11 by column 12 to get the Total Volume Increase for A & B, and for C trees to be listed to nearest board foot in columns 8 and 13 respectively. (Check - machine multiplication check)

(a) Total down columns 8 and 13. (Check - adding machine check)

(b) Divide Total column 8 by Total column 4 and Total column 13 by Total column 9 to get the average volume increase per tree based on the present number of trees. List in the average line in columns 7 and 12 respectively.

11. By dbh classes and totals add columns 3, 8 and 13 across and list the sums on corresponding lines in column 16 (Future Net Log Scale Volume). (Check - adding machine tape; cross total).

12. By corresponding dbh classes and total subtract column 1 from column 16 and enter results in column 14. (Check - adding machine tape)

13. In column 18 enter for each dbh class the overrun that dbh will have after the growth period from Table 8, page 109, change in Net Log Scale Overrun due to growth after selective logging. (ties not converted commonly used)

14. Multiply Total Future net log scale volumes in column 16 by corresponding future overrun in column 18 to get the Total Future Lumber Volumes to list in column 19. (Check - machine multiplication check) (Add 1.00 to overrun before multiplying)

15. Add column 19 down. (Check - adding machine tape)

16. Divide Total column 19 by Total column 16 to get average future overrun. Enter in column 18, average block. (Check - machine division check)

17. Find reciprocal of number of acres in the area sampled (1.00 to four or more places (see form heading for Area Sampled). area sampled) Multiply the volumes by dbh classes only in column 14, 16 and 19 by this reciprocal, listing the products to the nearest 1/10 board foot in column 15, 17 and 20 respectively. (machine division and multiplication checks.) Reciprocal check - When reciprocal is multiplied by area sampled the product is "1".

18. Add down columns 15, 17 and 20. (Check - adding machine tape; total 14, 16 and 19 multiplied by reciprocal should closely approximate or equal the added totals of columns 15, 17 and 20 respectively.)



19. Divide Total column 15 by the Growth Period in years (see sheet heading) to get the Average Net Increase Per Year in Net Log Scale Volume to be listed below column 15 total. (Check - machine division check)

20. (a) Divide Total Net Increase in Net Log Scale Volume (total column 14) by the number of years in the growth period to get the total increase per year. Divide this figure by the Total Net Log Scale Volume in column 1 on total line to get the simple interest average rate of increase per year to be listed in column 15 below Volume Per Year.

(b) To get the compound interest rate divide the Future Net Log Scale (Total column 16) by the Present Log Scale Volume on total line in column 1 to get  $(1.0p)^n$ . Look up  $(1.0p)^n$  in interest tables to get the compound rate to be listed in column 15 below Value Per Year. (Check - machine division check).

(c) Indicate whether rate is simple or compound by crossing out the word on the form that does not apply.

#### Marginal Value Increase

1. In column 21 list the percent of 2" dbh added during the growth period from Table 9, Selective Logging Growth Rate Tables. List for each dbh class represented in column 19 of Form 91. (Check - copy and line check).

2. In column 22 list by dbh classes the present Marginal values per M from the Stand Left block, column 16, on Form 87. (Check - copy and line check).

3. On the Marginal Value Trend graph plot the figures in column 22.

4. Draw a smooth curve through the points plotted. Extend the curve at both ends to include one dbh beyond those listed in column 22.

5. Read the curve and list the values vertically on dbh lines in graph. List values for 8" and 10" dbh on corresponding lines in column 22.

6. Subtract values for adjacent dbh classes listed on graph and list each difference in the lower dbh class in column 23 (Trend in 2" dbh)

7. Multiply column 21 by column 23 and list in column 24 by corresponding dbh classes.

8. Add columns 22 and 24 by dbh classes and list in column 25. (Check-adding machine tape). (List only positive Values)/

9. List future Total Lumber Tally Volume from column 19, Form 91, in column 26, Form 91. (Check - copy-line check)

10. List in columns 27 and 28 by dbh classes only the positive Present



Total and Per-Acre Marginal Values from Form 87, Total Stand Left, columns 17 and 19. Do not list negative values. Total columns 27 and 28 down. (Check-copy line and position check)

10a. Compute average column 22 by dividing the total of column 27 by the total column 5 on form 87 for the stand left only.

11. Multiply column 25 by column 26 and list product on corresponding dbh lines in column 31. (Check - machine multiplication check)

12. Subtract by dbh classes column 27 from column 31 and list in column 29. (Check - adding machine check)

13. Total columns 29 and 31 down. (Check adding machine tape, total column 27 plus total column 29 must equal total column 31.)

13a. Compute average column 25 by dividing total column 31 by total column 26.

14. Multiply dbh values in column 31 by the reciprocal of the number of acres sampled ( $\frac{1.00}{\text{area sampled}}$ ) (see heading for area sampled) to get the value per acre to list in column 32. (Check - machine multiplication check)

15. Add column 32 down. (Check - adding machine tape)

16. Subtract by dbh and total values the figures in column 28 from those in column 32 and list the differences in column 30 on corresponding lines. (Check - adding machine tape, cross total, values in column 29 x reciprocal should approximate closely the values in column 30.)

17. Divide Total column <sup>29</sup>~~30~~ by number of years in period (see heading) and get the total increase in value per year. Divide this figure by total column 27 to get the simple interest average rate per year to be listed in Rate Per Year at bottom of column 30.

(b) Divide Total column 31 by Total column 27 to get  $(1.0p)^n$ . Look up  $(1.0p)^n$  in interest table to get compound rate of increase in value per year. List in Rate Per Year at bottom of column 30.

(c) Indicate whether rate is simple or compound by crossing out the word that does not apply.

THIS COMPLETES THE INDIVIDUAL SPECIES FORMS 91.

#### b. Summary Form 91

##### Part I (Volume)

1. From individual species forms 91 add together by dbh classes and totals the corresponding columns listed below and list the sums in their respective columns on Summary Form 91.

- |                                 |                              |
|---------------------------------|------------------------------|
| (a) Col. 14                     | (e) Col. 29                  |
| (b) " 15 (Inc.*Per Acre Per Yr. | (f) Col. 30 (Inc.* Value Per |
| (c) " 16                        | Acre per Year)               |
| (d) " 19                        | (g) Col. 31                  |

\* Including

2. Divide Totals, columns 16, 19 and 31, by number of acres sampled and enter per-acre totals on total lines in columns 17, 20 and 32 respectively.

3. From Summary Form 87 for all Species for Total Stand Left list -

- (a) Col. 1 (Form 91) from col. 2 (Form 87) for the Stand Left
- (b) Col. 27 (Form 91) from col. 17 (Form 87) Stand Left.
- (c) Col. 28, total per acre only, (Form 91) from col. 19, total per acre, (Form 87) Stand Left.

(Copy check - line and position check)

4. Compute Average Overrun (column 18 Average line) by dividing Future lumber tally total, column 19, by future log scale total, column 16. (Machine division check)

5. Determine and check the rate of volume increase in column 15 for either compound or simple interest as directed for individual species forms in step 20, page 89.

6. Determine and check the rate of value increase in column 30 for either compound or simple interest as directed for individual species forms in step 18, page 90.

THIS COMPLETES THE ALL SPECIES SUMMARY, FORM 91. NO OTHER COLUMNS NEED BE COMPLETED.









Form 312

STAND STRUCTURE ANALYSIS

VOLUME GROWTH - MARGINAL VALUE INCREASE CALCULATIONS

Entered, W.B.  
Checked, C.S.  
For, C.S.  
Checked, W.B.

Area Sampled, 43.4 Acres  
Date completed, Sept. 8, 1942

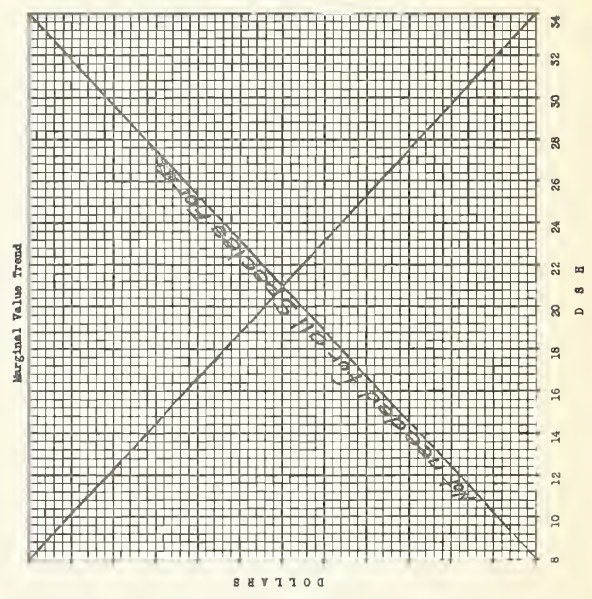
Growth Period 10 Years

Company:  
Species: All  
Growth Table Condition Used: ✓

Present	Net for Scale Volume Growth in Period										Net Increase				FUTURE				Total Average	
	A A B Viscor Groups					C Viscor Group					In Net Log		Set Log		Over		Lumber Tally			
	Number of Trees		Volume Increase		Present % of Survival	Number of Trees		Volume Increase		Total C	Total Acre	Per Acre	Total Acre	Per Acre	Run	Total Acre	Per Acre			
	Mo. Survival	Mo. Future	Per Tree	Mo. Survival		Mo. Future	Per Tree													
D	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12	5284	—	—	—	—	—	—	—	—	—	—	—	—	9743	225	15027	—	—	18306	—
14	23301	—	—	—	—	—	—	—	—	—	—	—	—	8304	191	31605	—	—	20765	—
16	34971	—	—	—	—	—	—	—	—	—	—	—	—	7273	168	41644	—	—	41631	—
18	37122	—	—	—	—	—	—	—	—	—	—	—	—	7637	176	44754	—	—	53488	—
20	43073	—	—	—	—	—	—	—	—	—	—	—	—	9340	215	52413	—	—	55452	—
22	32752	—	—	—	—	—	—	—	—	—	—	—	—	5442	125	38194	—	—	63600	—
24	30616	—	—	—	—	—	—	—	—	—	—	—	—	4752	109	35438	—	—	45239	—
26	25327	—	—	—	—	—	—	—	—	—	—	—	—	3184	73	21511	—	—	41329	—
28	10312	—	—	—	—	—	—	—	—	—	—	—	—	899	21	11211	—	—	32975	—
30	4494	—	—	—	—	—	—	—	—	—	—	—	—	459	11	4923	—	—	12423	—
32	1105	—	—	—	—	—	—	—	—	—	—	—	—	120	3	1926	—	—	5692	—
Total	241521	—	—	—	—	—	—	—	—	—	—	—	—	67665	1605	318192	—	—	392156	9452
Average	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23.5

Per Year { 160.5 Volume 2.8 % Rate Sample

Present	Marginal Value per H Increase										Future										Total Average
	Marginal Values per H					Future					Marginal Values					Increase					
	% of 2 <sup>nd</sup> DBH Added		Trend in Increase			Total Lumber Tally			Future		Present		Total			Per Acre		Total			
	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	
D	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—





# SURVIVAL FOR ALL SPECIES

Survival in Numbers of Trees for  
Intervals after Selective Logging

(These factors are for the trees in the Stand Left only)

## A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	.85	.75	.70	.60
10	.90	.80	.75	.70
12	.90	.85	.80	.75
14	.95	.90	.85	.80
16	.95	.90	.90	.85
18	.95	.95	.90	.85
20	.95	.95	.90	.90
22	.95	.95	.95	.90
24	1.00	.95	.95	.95
26	1.00	1.00	.95	.95
28	1.00	1.00	1.00	.95
30	1.00	1.00	1.00	1.00
32	1.00	1.00	1.00	1.00

## C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	.80	.70	.55	.40
10	.85	.75	.65	.50
12	.90	.80	.70	.60
14	.90	.80	.75	.65
16	.90	.85	.80	.70
18	.95	.85	.80	.75
20	.95	.90	.85	.75
22	.95	.90	.85	.80
24	.95	.90	.85	.80
26	.95	.90	.85	.80
28	.95	.95	.90	.85
30	.95	.95	.90	.85

Survival in Original Log Scale for  
Interval after Selective Logging

(Stand left only)

## A, B, & C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	.80	.65	.55	.45
10	.85	.75	.70	.60
12	.90	.85	.80	.70
14	.95	.85	.85	.80
16	.95	.90	.85	.80
18	.95	.95	.90	.85
20	.95	.95	.90	.90
22	.95	.95	.95	.90
24	.95	.95	.95	.95
26	1.00	.95	.95	.95
28	1.00	1.00	.95	.95
30	1.00	1.00	1.00	.95
32	1.00	1.00	1.00	1.00



INCREASE IN NET BOARD FOOT LOG SCALE  
AFTER SELECTIVE LOGGING

(for stands left after selective cuts removing  
40 - 60 percent of the net log scale volume)

Increase in net log scale volume per tree  
for periods of 5, 10, 15, and 20 years  
after selective logging.

U. S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE REGION NINE  
MILWAUKEE, WISCONSIN  
1942



## Growth Increase Tables

These tables show the Scribner net log scale volume growth after a selective cut removing 40 to 60% of the original net log scale volume in the average old growth Northern Hardwoods sawtimber stand. The growth increase figures given are before deducting mortality.

### Basis

The growth increase tables are based on over 600 individual growth measurements made 10 - 15 years after moderate selective cutting. The trees were graded by quality and vigor class at the approximate time of the measurements. The growth measurements were applied against the Scribner net log scale volume tables provided in this booklet. These tables in turn were based on actual scaled volumes of more than 2500 trees which were included in the Trout Creek and Alberta Mill Scale studies. Some of the growth increase tables show species groups because of insufficient data on minor species. In such cases the underlined species heading the list is the one from which the growth was determined.

### Merchantability Standards

Utilization or merchantability standards are the same as for the volume tables which include the commercial board foot volume above the stump to the point where the stem divides into branches or is otherwise non-commercial. The volume table is not suitable for trees containing less than one 8' log to a 10" top d.i.b.

### Correlation between volume tables and growth increase tables

The growth is in terms of saleable sawlogs or ties. It includes only that ingrowth from the 8" and 10" diameter class trees which will have reached a size permitting the cutting of at least one 8' log to a 10" top d.i.b. in the 5 to 20-year periods established.

The growth increase figures for the 10" trees are generally higher than the figures for the 12, 14 and sometimes 16" diameter classes. This is because the 10" trees which now contain no commercial volume will, in a period of 5 years or more, grow to commercial size. The volume for the 10" tree therefore increases from no board feet to 20 - 40 board feet in the same time that larger trees increase only 5 - 10 percent of their volume before selective cutting. The "timber condition" classes of the growth increase tables correspond to those of the volume tables. The tables used in computing the volume growth increase should therefore be of the same timber condition class as the volume tables that were used in computing the original estimate.

These tree class growth tables have no reference to tree quality, but only to tree vigor, and the trees of A and B vigor are separated from those of C vigor alone.

INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
SELECTIVE LOGGING

Table 7  
Sugar Maple  
(Red Maple)  
(Black Ash)

Sugar Maple  
(Red Maple)  
(Black Ash)

(Net Log Scale Board Foot Volume Increase per Tree.)

TIMBER CONDITION  
EXCELLENT

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	3	35	67
10	33	65	88	111
12	23	46	68	92
14	25	49	72	98
16	26	52	77	103
18	28	55	81	109
20	29	58	85	113
22	30	60	87	114
24	29	58	84	110
26	28	56	81	105
28	26	53	76	99
30	24	49	71	93

EXCELLENT

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	6
10	17	33	48	59
12	10	20	30	41
14	14	28	40	51
16	15	30	43	56
18	15	31	45	59
20	16	31	45	59
22	15	31	44	58
24	15	30	43	57
26	14	29	41	54
28	14	28	40	52
30	13	25	37	48

EXCELLENT

Sugar Maple  
(Red Maple)  
(Black Ash)

TIMBER CONDITION  
GOOD

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	3	32	61
10	30	59	79	100
12	20	40	60	82
14	22	44	65	88
16	24	47	70	94
18	25	51	74	100
20	27	54	79	105
22	28	56	81	107
24	27	55	79	103
26	26	51	74	96
28	24	48	69	90
30	22	45	64	83

GOOD

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	5
10	15	30	43	54
12	9	18	26	35
14	12	24	34	46
16	14	28	41	52
18	14	28	41	54
20	14	29	41	54
22	14	29	41	54
24	14	28	40	53
26	13	27	39	51
28	13	26	37	48
30	12	23	34	44

GOOD

Table 7  
 Sugar Maple INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
 (Red Maple)  
 (Black Ash)  
 SELECTIVE LOGGING

Sugar Maple  
 (Red Maple)  
 (Black Ash)

(Net log Scale Board Foot Volume Increase per Tree.)

TIMBER CONDITION  
 FAIR

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	3	29	56
10	27	54	72	89
12	17	35	52	72
14	19	39	58	79
16	22	43	64	87
18	23	47	69	93
20	25	50	73	98
22	26	53	76	100
24	25	51	73	95
26	24	47	68	88
28	22	43	62	80
30	19	39	56	73

FAIR

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	5
10	13	27	39	48
12	8	16	22	31
14	10	20	29	40
16	13	25	36	48
18	13	27	39	51
20	14	27	39	51
22	13	27	38	50
24	13	26	37	49
26	12	24	35	45
28	11	22	32	42

FAIR

TIMBER CONDITION  
 POOR

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	2	26	49
10	24	49	63	79
12	15	30	46	63
14	17	34	51	70
16	19	38	57	77
18	21	42	62	84
20	23	46	67	90
22	24	48	69	91
24	23	46	65	85
26	20	41	59	76
28	19	38	54	69
30	17	33	48	62

POOR

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	4
10	12	25	35	44
12	7	13	19	26
14	9	18	26	35
16	11	22	31	42
18	12	24	35	46
20	13	25	36	47
22	12	25	35	46
24	12	23	33	44
26	11	22	32	41
28	10	20	29	38

POOR

Sugar Maple  
 (Red Maple)  
 (Black Ash)

INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
SELECTIVE LOGGING

Yellow Birch

(Net Log Scale Board Foot Volume Increase per Tree)

TIMBER CONDITION EXCELLENT					TIMBER CONDITION GOOD				
A & B VIGOR					A & B VIGOR				
DBH	5 Years	10 Years	15 Years	20 Years	DBH	5 Years	10 Years	15 Years	20 Years
8			24	54	8	-	-	22	49
10	30	59	76	89	10	27	54	69	80
12	12	25	38	54	12	10	21	32	45
14	16	32	48	66	14	14	28	41	58
16	19	38	56	77	16	17	34	50	68
18	22	44	63	86	18	19	39	56	77
20	24	48	69	93	20	21	43	62	84
22	25	51	74	98	22	23	47	68	90
24	26	52	76	101	24	24	48	69	92
26	27	53	78	102	26	24	49	71	93
28	26	53	77	101	28	24	49	71	93
30	26	52	75	98	30	24	48	69	90
32	24	49	71	92	32	23	46	66	86
EXCELLENT					GOOD				
C VIGOR					C VIGOR				
DBH	5 Years	10 Years	15 Years	20 Years	DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	-	8	-	-	-	-
10	14	27	39	51	10	12	24	35	46
12	9	18	26	32	12	7	14	20	26
14	11	22	32	42	14	10	19	28	37
16	13	26	37	49	16	11	22	32	42
18	13	27	39	51	18	12	24	34	46
20	13	27	39	51	20	12	24	34	46
22	13	26	38	50	22	12	24	34	45
24	12	25	36	48	24	12	23	34	44
26	12	24	34	45	26	11	22	32	41
28	11	22	31	41	28	10	20	29	38
EXCELLENT					GOOD				



INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
SELECTIVE LOGGING

Yellow Birch

(Net Log Scale Board Foot Volume Increase per Tree)

TIMBER CONDITION  
FAIR

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	20	45
10	25	50	62	71
12	8	16	25	37
14	12	24	36	50
16	15	30	44	60
18	17	35	51	70
20	20	40	58	79
22	22	44	64	85
24	23	46	66	88
26	23	47	68	90
28	23	47	69	90
30	23	46	66	87
32	22	44	63	82

FAIR

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	-
10	11	22	32	42
12	5	11	16	21
14	7	15	22	29
16	9	18	26	35
18	10	21	30	40
20	11	22	32	42
22	11	23	33	43
24	11	23	33	43
26	11	21	31	40
28	10	20	28	37

FAIR

TIMBER CONDITION  
POOR

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	18	41
10	22	45	55	61
12	6	12	18	26
14	8	16	23	32
16	9	19	28	38
18	11	22	32	43
20	12	25	36	48
22	13	26	37	50
24	13	26	38	50
26	13	25	37	48
28	12	25	36	47
30	12	23	33	44
32	11	22	33	39

POOR

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	-
10	10	20	29	38
12	4	8	12	16
14	5	11	15	20
16	6	13	18	24
18	7	13	19	26
20	7	13	19	25
22	6	13	18	24
24	6	12	18	23
26	5	11	16	21
28	5	10	14	18

POOR

Yellow Birch



INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
SELECTIVE LOGGING

Table 7  
Basswood  
(White Pine)  
(White Spruce)

Basswood (White Pine) (White Spruce) (Red Oak) (Red Oak)

(Net Log Scale Board Foot Volume Increase per Tree.)

TIMBER CONDITION  
EXCELLENT

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	9	37	68
10	29	59	88	119
12	29	59	90	123
14	33	66	100	136
16	37	74	111	150
18	40	81	121	162
20	44	89	131	175
22	47	94	138	184
24	49	98	142	189
26	49	99	143	190
28	50	100	144	191
30	49	98	141	185
32	47	95	136	178

EXCELLENT

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	--	-	8
10	11	22	32	43
12	12	24	34	47
14	14	28	40	54
16	15	31	44	59
18	17	34	49	65
20	18	36	52	69
22	19	38	55	73
24	20	39	57	75
26	20	40	57	77
28	20	41	58	78
30	20	41	59	77

EXCELLENT

Basswood  
(White Pine)  
(White Spruce)  
(Red Oak)

TIMBER CONDITION  
GOOD

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	9	36	64
10	28	57	82	109
12	26	52	79	108
14	29	58	88	118
16	32	64	95	128
18	34	69	102	137
20	37	74	109	145
22	39	78	114	151
24	40	80	116	154
26	40	81	117	154
28	40	81	116	154
30	40	79	115	151
32	39	78	113	149

GOOD

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	8
10	11	22	31	41
12	11	21	30	41
14	12	24	35	46
16	13	26	38	50
18	14	28	41	55
20	15	30	44	58
22	16	31	45	61
24	16	33	48	63
26	16	33	47	64
28	17	33	48	64
30	17	34	48	64

GOOD

Table 7

Basswood

(White pine)

(White spruce)

(Red Oak)

INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
SELECTIVE LOGGINGBasswood (White Pine) (White Spruce) (Red Oak)

(Net Log Scale Board Foot Volume Increase per Tree.)

TIMBER CONDITION  
FAIR

## A &amp; B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	9	35	60
10	27	54	75	97
12	21	43	65	89
14	23	47	69	94
16	25	50	74	100
18	27	54	79	106
20	29	57	84	113
22	30	61	89	119
24	32	63	93	123
26	32	65	94	125
28	33	66	95	126
30	33	66	94	124
32	32	64	91	120

FAIR

## C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	7
10	10	21	30	38
12	9	17	25	34
14	9	19	27	36
16	10	20	29	39
18	11	21	31	41
20	11	22	33	44
22	12	24	35	47
24	12	25	36	49
26	13	26	37	50
28	13	26	38	51
30	14	27	39	52

FAIR

Basswood  
(White Pine)  
(White Spruce)  
(Red Oak)TIMBER CONDITION  
POOR

## A &amp; B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	8	32	54
10	26	50	69	88
12	19	38	56	76
14	19	39	57	77
16	20	40	59	79
18	21	42	61	81
20	22	43	64	85
22	23	45	66	88
24	23	46	67	88
26	23	46	66	87
28	22	45	65	85
30	22	44	63	82
32	21	42	60	78

POOR

## C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	7
10	10	20	28	35
12	8	15	22	29
14	8	16	23	30
16	8	16	24	31
18	8	17	24	32
20	8	17	25	32
22	9	17	25	33
24	9	17	25	33
26	9	18	25	33
28	9	17	25	33

POOR

INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
SELECTIVE LOGGINGElm

(Net Log Scale Board Foot Volume Increase per Tree)

TIMBER CONDITION EXCELLENT					TIMBER CONDITION GOOD				
A & B VIGOR					A & B VIGOR				
DBH	5 Years	10 Years	15 Years	20 Years	DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	20	45	8	-	-	19	42
10	24	49	69	90	10	23	46	64	80
12	20	40	59	80	12	16	32	47	64
14	22	43	64	87	14	17	35	51	69
16	24	48	70	94	16	19	38	56	76
18	25	50	73	102	18	21	42	61	84
20	30	61	88	122	20	24	48	70	97
22	35	70	101	140	22	28	56	81	112
24	41	81	118	159	24	33	66	96	133
26	43	86	125	165	26	39	78	113	151
28	43	86	124	163	28	40	80	116	153
30	41	82	119	157	30	39	78	112	147
32	40	80	115	151	32	37	74	107	141

EXCELLENT C VIGOR					GOOD C VIGOR				
DBH	5 Years	10 Years	15 Years	20 Years	DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	-	8	-	-	-	-
10	6	12	18	23	10	6	12	17	22
12	10	20	28	37	12	8	16	23	30
14	11	23	33	44	14	9	18	26	34
16	14	27	39	53	16	11	21	30	41
18	16	33	47	63	18	13	26	37	50
20	19	38	55	73	20	15	31	45	60
22	22	44	64	86	22	19	37	54	72
24	25	51	73	97	24	22	44	64	85
26	27	55	79	104	26	24	49	71	93
28	27	54	78	103	28	25	50	72	95

EXCELLENT

Elm

GOOD

INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
SELECTIVE LOGGING

Elm

(Net Log Scale Board Foot Volume Increase per Tree)

TIMBER CONDITION  
FAIR

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	18	41
10	22	45	59	71
12	12	24	36	19
14	13	27	40	55
16	15	31	45	62
18	17	35	51	71
20	20	41	59	81
22	23	47	68	93
24	27	54	78	106
26	31	62	91	120
28	31	63	92	120
30	30	61	88	116
32	30	59	86	113

TIMBER CONDITION  
POOR

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	17	38
10	21	42	54	64
12	9	18	27	38
14	11	22	32	44
16	13	25	37	51
18	14	29	42	58
20	16	33	48	65
22	18	37	54	73
24	20	41	59	79
26	21	42	62	82
28	21	43	63	82
30	21	41	60	78
32	19	39	56	73

FAIR

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	-
10	6	11	16	21
12	6	13	19	25
14	7	15	22	29
16	9	18	25	34
18	10	19	28	42
20	12	25	36	49
22	15	30	43	58
24	18	36	51	69
26	20	40	58	77
28	20	41	59	78

FAIR

POOR

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	-
10	5	11	15	20
12	5	11	16	21
14	6	12	18	23
16	7	14	21	27
18	8	17	24	33
20	10	20	29	38
22	12	23	34	45
24	13	27	39	52
26	15	29	42	56
28	14	29	41	54

POOR

Elm



Table 7  
Hemlock  
(Northern White Cedar)

INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
SELECTIVE LOGGING

Hemlock - (Northern White Cedar)

(Net Log Scale Board Foot Volume Increase per Tree)

TIMBER CONDITION  
EXCELLENT

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	3	28	55
10	27	53	73	93
12	20	39	58	79
14	21	41	62	86
16	24	48	73	101
18	30	59	90	127
20	39	78	116	160
22	47	93	137	184
24	50	100	145	192
26	50	100	145	191
28	50	99	143	188
30	47	95	138	180
32	45	91	130	167

TIMBER CONDITION  
GOOD

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	2	26	50
10	24	49	65	81
12	16	33	50	68
14	18	37	56	77
16	22	43	65	90
18	26	52	79	111
20	34	67	100	136
22	39	78	113	152
24	40	81	116	153
26	39	78	113	148
28	37	74	107	140
30	35	70	101	131
32	32	65	94	122

EXCELLENT

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	4
10	13	26	37	48
12	11	22	32	43
14	13	26	37	50
16	16	31	45	61
18	18	37	53	72
20	21	41	60	80
22	23	46	66	88
24	24	49	70	94
26	25	50	72	96
28	25	51	74	97

GOOD

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	4
10	12	23	34	43
12	10	19	28	37
14	11	22	32	44
16	14	28	40	54
18	16	32	47	63
20	18	35	51	68
22	19	38	54	72
24	19	39	56	74
26	19	39	56	74
28	19	38	55	72

EXCELLENT

Hemlock  
(Northern White Cedar)

GOOD



Table 7

Hemlock INCREASE IN NET BOARD FOOT LOG SCALE AFTER  
(Northern White Cedar) SELECTIVE LOGGING

Hemlock - (Northern White Cedar)

(Net Log Scale Board Foot Volume Increase per Tree)

TIMBER CONDITION  
FAIR

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	2	23	43
10	21	43	56	69
12	13	26	41	57
14	16	32	48	66
16	19	37	56	78
18	23	46	69	97
20	29	58	87	118
22	34	67	98	132
24	35	71	102	133
26	33	66	95	124
28	30	61	87	111
30	26	52	74	94
32	21	42	59	74

FAIR

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	3
10	11	21	30	38
12	7	15	21	29
14	10	19	28	38
16	12	24	35	48
18	14	28	41	55
20	16	31	45	60
22	16	33	47	63
24	17	34	48	64
26	16	33	47	62
28	15	31	44	58

FAIR

(Northern White Cedar)

TIMBER CONDITION  
POOR

A & B VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	2	17	32
10	16	32	42	54
12	11	22	32	43
14	11	22	32	43
16	11	22	34	46
18	13	26	39	55
20	16	32	48	66
22	19	37	55	74
24	20	40	58	77
26	30	40	58	76
28	20	39	57	74
30	19	37	54	69
32	17	33	47	60

POOR

C VIGOR

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	-	3
10	8	16	22	29
12	6	12	18	24
14	7	13	19	26
16	7	15	21	28
18	8	16	22	30
20	8	16	24	31
22	9	17	25	33
24	9	18	27	35
26	9	19	27	36
28	10	20	28	37

POOR

CHANGE IN NET LOG SCALE OVERRUN DUE TO GROWTH  
AFTER SELECTIVE LOGGING

(Overrun percent -ties not converted to lumber)

Sugar Maple - Red Maple  
Black Ash

DBH	5 Years	10 Years	15 Years	20 Years
8	-	40.0	39.0	37.0
10	38.5	36.5	34.5	31.5
12	33.0	30.0	27.5	26.5
14	27.0	25.0	24.0	22.5
16	23.0	22.0	20.5	19.5
18	20.0	18.5	17.5	16.5
20	17.0	15.5	14.5	13.5
22	13.5	12.5	11.5	10.0
24	10.5	9.0	8.5	7.5
26	8.0	6.0	5.5	4.5
28	4.5	3.5	2.5	1.5
30	1.5	0.5	0	-1.0
32	-1.0	-2.0	-3.0	-4.0

Yellow Birch

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	40.5	39.5
10	40.0	39.0	38.0	36.0
12	36.5	35.0	33.0	31.5
14	32.0	30.5	29.0	27.5
16	27.5	26.5	25.0	24.0
18	24.0	22.5	21.5	20.5
20	20.5	19.5	18.5	17.5
22	17.5	16.5	15.5	14.5
24	14.5	14.0	13.0	12.5
26	12.5	12.0	11.5	11.0
28	11.0	11.0	10.5	10.5
30	10.5	10.0	10.0	10.0

Basswood - White Pine  
White Spruce - Red Oak

DBH	5 Years	10 Years	15 Years	20 Years
8	-	33.0	32.0	30.5
10	32.0	31.0	28.5	26.0
12	28.5	26.0	24.0	21.5
14	23.5	21.0	20.0	18.5
16	19.5	18.0	17.0	15.5
18	16.5	15.0	14.0	12.5
20	13.5	12.0	11.5	10.5
22	11.0	10.0	9.5	9.0
24	9.5	9.0	8.5	8.5
26	8.5	8.0	7.5	7.5
28	7.5	7.0	7.0	6.5
30	7.0	6.5	6.5	6.0
32	6.5	6.0	6.0	6.0

Elm

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	51.5	49.0
10	50.5	48.0	45.5	42.5
12	44.0	40.5	38.0	34.5
14	36.0	34.0	31.5	29.5
16	30.0	28.0	26.0	24.0
18	24.0	22.0	20.5	19.5
20	19.5	18.0	17.0	16.0
22	16.0	14.5	13.5	12.5
24	12.5	11.5	10.5	9.5
26	9.5	8.5	7.5	6.5
28	6.5	6.0	5.0	4.5
30	4.5	4.0	3.5	3.0
32	3.0	2.5	2.0	2.0

Table 8

CHANGE IN NET LOG SCALE OVERRUN DUE TO GROWTH  
AFTER SELECTIVE LOGGING

(Overrun percent-ties not converted to lumber)

Hemlock - White Cedar

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	61.5	60.0
10	59.5	57.5	55.5	53.0
12	53.0	49.5	46.5	44.0
14	44.5	41.5	39.5	37.5
16	38.0	36.0	34.0	32.5
18	33.0	31.0	29.5	28.5
20	29.0	27.5	26.5	26.0
22	26.0	25.5	24.5	24.0
24	24.0	23.5	23.0	22.0
26	22.5	22.0	21.0	20.5
28	20.5	20.0	19.5	18.5
30	19.0	18.5	18.0	17.0
32	17.5	17.0	16.5	16.0

(Overrun percent - Ties Converted to 3A. Lumber)

Sugar Maple

DBH	5 Years	10 Years	15 Years	20 Years
8	-	15.0	15.5	16.0
10	15.5	16.0	16.5	17.5
12	17.0	18.0	18.5	18.5
14	18.5	18.5	18.5	18.5
16	17.5	16.5	15.5	15.0
18	15.0	14.0	13.0	12.5
20	12.5	11.5	11.0	10.0
22	10.0	9.0	8.5	8.0
24	8.0	7.0	6.5	5.5
26	5.5	4.5	4.0	3.0
28	3.0	2.0	1.0	0
30	0	-1.0	-2.0	-3.0

Yellow Birch

DBH	5 Years	10 Years	15 Years	20 Years
8	-	-	16.0	17.0
10	16.5	18.0	19.0	20.0
12	19.5	20.5	21.5	22.5
14	22.0	23.0	23.5	23.5
16	23.5	23.0	23.0	23.0
18	22.0	20.5	19.5	18.0
20	17.5	16.0	14.0	13.0
22	13.0	12.0	11.0	10.5
24	10.5	9.5	9.0	8.5
26	8.5	8.5	8.0	8.0
28	8.0	7.5	7.5	7.5
30	7.5	7.5	7.5	7.5
32	7.5	7.0	7.0	7.0

## SELECTIVE LOGGING GROWTH RATE TABLES

Table 9

(diameter increase)

Total Stand

Figures represent that part of the 2" interval between DBH classes  
attained during the growth period.

Sugar Maple-Red Maple-Black Ash

DBH	5 Years	10 Years	15 Years	20 Years
8	.44	.90	1.30	1.70
10	.42	.86	1.23	1.61
12	.40	.82	1.19	1.55
14	.39	.80	1.15	1.50
16	.39	.78	1.13	1.48
18	.39	.77	1.11	1.46
20	.39	.77	1.09	1.44
22	.38	.76	1.08	1.43
24	.38	.76	1.07	1.42
26	.38	.76	1.07	1.41
28	.38	.75	1.06	1.41
30	.37	.74	1.06	1.41
32	.37	.74	1.06	1.41
34	.37	.74	1.05	1.40
36	.36	.73	1.05	1.40

Yellow Birch

DBH	5 Years	10 Years	15 Years	20 Years
8	.40	.82	1.20	1.58
10	.38	.77	1.12	1.49
12	.36	.73	1.06	1.42
14	.35	.70	1.02	1.37
16	.34	.69	1.00	1.33
18	.33	.68	.99	1.31
20	.33	.67	.98	1.30
22	.33	.67	.98	1.30
24	.33	.67	.98	1.30
26	.33	.67	.98	1.30
28	.33	.67	.98	1.30
30	.33	.67	.98	1.30
32	.33	.67	.98	1.30
34	.33	.67	.98	1.30
36	.33	.67	.98	1.30

Basswood-White Pine-White Spruce

DBH	5 Years	10 Years	15 Years	20 Years
8	.55	1.10	1.57	2.07
10	.52	1.04	1.50	1.99
12	.50	1.00	1.45	1.91
14	.48	.97	1.40	1.85
16	.47	.94	1.37	1.81
18	.46	.93	1.34	1.78
20	.46	.93	1.33	1.76
22	.46	.92	1.32	1.74
24	.45	.92	1.32	1.74
26	.45	.91	1.31	1.74
28	.45	.91	1.31	1.74
30	.45	.91	1.31	1.74
32	.45	.91	1.30	1.74
34	.45	.91	1.30	1.73
36	.45	.91	1.30	1.73

Elm

DBH	5 Years	10 Years	15 Years	20 Years
8	.44	.88	1.23	1.63
10	.40	.80	1.16	1.53
12	.38	.75	1.09	1.45
14	.36	.72	1.05	1.40
16	.35	.70	1.03	1.37
18	.34	.69	1.01	1.34
20	.34	.69	1.01	1.34
22	.34	.68	1.00	1.33
24	.34	.68	1.00	1.32
26	.34	.68	.99	1.31
28	.34	.68	.99	1.31
30	.34	.68	.99	1.30
32	.34	.68	.99	1.30
34	.34	.68	.99	1.30
36	.34	.68	.98	1.30

Table 9

## Hemlock-White Cedar

DBH	5 Years	10 Years	15 Years	20 Years
8	.33	.67	.99	1.32
10	.36	.72	1.06	1.38
12	.38	.76	1.10	1.44
14	.39	.78	1.14	1.50
16	.40	.80	1.16	1.54
18	.40	.80	1.17	1.54
20	.40	.80	1.17	1.54
22	.40	.80	1.16	1.54
24	.40	.80	1.16	1.54
26	.39	.80	1.16	1.54
28	.39	.80	1.16	1.54
30	.39	.80	1.15	1.53
32	.39	.79	1.15	1.52
34	.39	.79	1.15	1.52
36	.38	.79	1.14	1.51
38	.38	.78	1.14	1.50



## SUMMARY

The type of summary used will depend on the objectives of each analysis. The following outline suggests a form of summary helpful in the case of an owner-operator who processes his material into lumber or lumber products and who wishes to compare clear cutting with a selective cutting plan. This is a useful form of summary for an owner or owner-operator to use in appraising a stand for purchase or sale.

Where the owner deals only in logs a modification of this summary is desirable.

For the practicing forester operating on forest land for which definite cutting policy has been adopted, certain modifications of this stand summary may be needed.

### I. Stand Summary

#### A. Total Stand

1. Volume log scale by species combining the stand to be cut and to be left.
2. Volume log scale by species to be cut

#### B. Per Acre Stand - all species combined

1. Total volume log scale
2. Total number trees by dbh
3. Volume to be cut log scale
4. Number trees to be cut by dbh

### II. Stand Appraisal

#### A. Costs

1. Average cost per M by species

#### B. Lumber prices

1. Average lumber value per M by species

#### C. Marginal values

1. Average marginal value per M by species

### III. Earning Power of Residual Stand

#### A. Volume growth per Acre per year

1. By species
2. For total stand

B. Total marginal value increase per acre per year

1. By species
2. For total stand

#### IV. Recommendations

A. Outline of immediate and long time action for owner to take

B. Marking guides

1. Intensity of cut
2. Priority list of tree class, size and species to cut
3. Silvicultural practices to consider

C. Estimated cost of recommended action



